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Sir:

Transmitted herewith for filing is the Patent Application of:

Inventors: Rodriguez, et al.
For: **System and Method for Automating Travel Agent Operations**

Enclosed are:

X Patent Specification and Declaration.

X sheets of drawing(s). (Formal) 21 Sheets.

X An assignment of the invention to International Business Machines Corporation (includes Recordation Form Cover Sheet).

___ A certified copy of a _____ application.

X Information Disclosure Statement, PTO 1449 and copies of references

The filing fee has been calculated as shown below:

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Respectfully submitted,

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System and Method for Automating Travel Agent Operations

RELATED APPLICATIONS

This application is related to the following co-pending U.S. Patent Applications filed on the same day as the present application and having the same inventors and assignee: "System and Method for Optimizing Travel Reservations," (Docket No. AUS9-2000-0695-US1) by Ponzini, Rodriquez, Smith, and Spinac; "System and Method for Updating User Home Automation System," (Docket No. AUS9-2000-0484-US1) by Rodriquez, Smith, and Spinac; and "System and Method for Downloading Travel Packages" (Docket No. AUS9-2000-0485-US1) by Rodriquez, Smith, and Spinac.

BACKGROUND OF THE INVENTION

1. Technical Field

The present invention relates in general to a method and system for automating travel agent operations. More particularly, the present invention relates to a system and method for optimizing a user's travel services using user and business profiles.

2. Description of the Related Art

Computer systems in general and International Business Machines (IBM) compatible personal computer systems in particular have attained widespread use for providing computer power to many segments of today's modern society. Systems with microprocessors are finding themselves in an array of smaller and more specialized objects that

previously were largely untouched by computer technology. Computer systems typically include a system processor and associated volatile and non-volatile memory, a display area, input means, and often interfaces, such as a network interface or modem, to other computing devices.

These computing devices are information handling systems which are designed primarily to give independent computing power to a single user, or a group of users in the case of networked computing devices. Personal computing devices are often inexpensively priced for purchase by individuals or businesses. Nonvolatile storage devices such as hard disks, CD-ROM drives and magneto-optical drives are considered to be peripheral devices. Computing devices are often linked to one another using a network, such as a local area network (LAN), wide area network (WAN), or other type of network, such as the Internet.

One of the distinguishing characteristics of these systems is the use of a system board to electrically connect these components together. At the heart of the system board is one or more processors. System manufacturers continually strive for faster, more powerful processors in order to supply systems for demanding applications.

Computer systems have become increasingly integrated with people's day-to-day lives. For example, many people keep their calendars electronically on a computer system. Another example is sending notes electronically as email rather than using postal or courier services. Computer automation has also proliferated to peoples' homes. For

example, many people have "smart houses" that include home automation technology. This technology enables lights, appliances, and other devices to operate automatically. Computer technology has also improved consumer banking. Consumers can now transfer money and pay bills electronically without having to write and deliver checks. Even telephone systems are increasingly computerized with computers interfacing with telephone systems and configuring the telephone according to the user's preferences. Telephone control may even reside in the user's personal computer.

In this increasingly modern age, work life is often fast-paced and global in nature. Because of these factors, workers in many industry segments travel or are out of the office for many days throughout the year. The fast-paced nature of many industries causes workers to change their schedules and plans on a daily basis. When the user needs to travel, there are often many activities that should be performed prior to the user's travel date, while the user is traveling, and just prior to the user's return to the office. These activities include: (1) updating the user's electronic calendar, (2) withdrawing money for the trip, (3) sending emails informing others that the user will be away, (4) changing home automation settings to turn lights and appliances on/off when the user is away, (5) configuring the telephone to forward telephone calls or change the voice mail greeting provided to callers, (6) hold or forward home mail deliveries, (7) hold or forward home parcel deliveries, (8) hold or forward mail and parcels received by the company mailroom, (9) hold

newspaper delivery, as well as other travel-related activities not mentioned above.

Currently, users perform travel related activities manually with little or no automation. Manually performing these activities is challenging to the user when facing the fast-paced work and travel environment of modern business. Because of the number of activities, it is difficult for users to remember to handle all travel-related tasks before traveling away from the office. Once away from the office, it is often much more difficult to perform travel related functions remotely. For example, to extend travel plans and have the post office hold mail longer, the user needs to contact his post office from a remote location and ask to have his mail held for an extended time. Contact information for local services, such as the post office or company mailroom, is often difficult to obtain when the user is at a remote location. What is needed, therefore, is a method for automating travel related actions to dynamically adjust to a user's ever-changing travel plans.

SUMMARY

It has been discovered that a travel agent can maintain a travel profile for users to perform actions that the user wishes to execute while the user is away from the office. These actions can be bundled into a travel package that is transmitted to the user in response to the user making travel arrangements. The travel agent can be an automated agent, such as an on-line travel agent, or a traditional brick-and-mortar travel agent that is used by the traveler. The travel agent processes the user's travel request and reads the user's profile for actions that the user would like to take while he is away. Once the actions are combined into a travel package, they are transmitted for processing. Optionally, the travel package can be received by the user so that the user has an opportunity to accept or reject individual actions within the travel package.

Once the actions are accepted, various processes take place depending upon the action and the user's preferences. One action is designed to notify the company mailroom of the user's delivery instructions. Another action is designed to notify mail and parcel services for handling of the user's home mail and parcel deliveries. An action is included for configuring the user's telephone while the user is away. Another action automatically updates the user's electronic calendar. Another action downloads emergency and medical information to the user's pervasive computing device related to health services at the traveling destination. Another action downloads travel related points of interests, restaurant information, and

driving instructions to the user's pervasive computing device. Traveling points of interest while in route to the final destination are also downloaded, such as an exhibit at an airport that the user is passing through or an event in a town along the user's driving route. Another action informs colleagues and contacts that the user will be out of the office. This action discriminates between users to allow some users, for example family members, to view all travel details, while other users will only receive summary information. Another action updates the user's home automation system to enter an "away" mode while the user is out of town and resets the system to a "home" mode upon the user's return. As seen by the many actions performed by the system, the downloadable travel package is flexible to provide actions for new situations that may be encountered by travelers.

These actions can be combined into a travel package by the travel agent. If the user wants to accept actions before they are performed, the travel package is optionally sent to the user. If the package is sent, the user browses the travel package and accepts or declines any or all of the actions included in the package. The accepted actions are executed performing the travel related services described above. If the user chooses not to have the package sent to him, the automated actions are performed automatically.

Another approach uses an electronic calendaring system for optimizing a user's travel reservations based on user preferences. The system provides one or more possible travel packages based on the user's preferences and, if

applicable, business policies or rules. The user selects a preferred package and the system, in turn, optimizes the package by querying servers containing travel information. Optimization is based upon the user's preferences and, if applicable, business policies or rules. In this manner, the user can book components of the trip and lock in on the best options available. The user can book certain components, for example airline reservations, before other aspects of the trip are booked. Optimization includes checking for combination deals that may be offered, such as hotel packages that include rental cars. However the reservations are made, vActions will be created to perform travel related tasks on behalf of the user.

The foregoing is a summary and thus contains, by necessity, simplifications, generalizations, and omissions of detail; consequently, those skilled in the art will appreciate that the summary is illustrative only and is not intended to be in any way limiting. Other aspects, inventive features, and advantages of the present invention, as defined solely by the claims, will become apparent in the non-limiting detailed description set forth below.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention may be better understood, and its numerous objects, features, and advantages made apparent to those skilled in the art by referencing the accompanying drawings. The use of the same reference symbols in different drawings indicates similar or identical items.

Figure 1 is a user interface screen for configuring a user's travel profile;

Figure 2 is a second user interface screen for configuring a user's travel profile;

Figure 3 is an entity action diagram showing various entities receiving instructions and commands related to the user's travel;

Figure 4 is a dataflow diagram showing data included in the system flowing among various processes and external entities;

Figure 5 is a flowchart for processing a user's travel request and notifying service agents;

Figure 6 is a flowchart for configuring a user's telephone in response to a user's travel plans and travel profile;

Figure 7 is a flowchart for automatically updating a user's electronic calendar in response to a user's travel plans;

Figure 8 is a flowchart for preparing and downloading emergency and medical information based on the user's profile and travel plans;

Figure 9 is a flowchart for preparing and downloading personal interest information based on the user's profile and travel plans;

Figure 10 is a flowchart for notifying various classes of people in the user's contact list regarding the user's travel plans;

Figure 11 is a flowchart for configuring a user's home automation system based on the user's profile and travel plans;

Figure 12 is a flowchart for preparing and packaging actions and sending packaged actions to the user for confirmation;

Figure 13 is a travel profile screen for selecting travel options;

Figure 14 is a travel ranking screen for assisting the user in ranking travel options;

Figure 15 is a network diagram of optimizing travel plans using a calendar server and service agents;

Figure 16 is a high level flowchart for optimizing travel plans using a calendar server and service agents;

Figure 17 is a flowchart for inputting user trip information;

Figure 18 is a flowchart for searching service agent servers for possible travel packages;

Figure 19 is a flowchart for optimizing and booking components within a desired travel package;

Figure 20 is a flowchart for optimizing components within travel packages; and

Figure 21 is a block diagram of an information handling system capable of implementing the present invention.

DETAILED DESCRIPTION

The following is intended to provide a detailed description of an example of the invention and should not be taken to be limiting of the invention itself. Rather, any number of variations may fall within the scope of the invention which is defined in the claims following the description.

Figure 1 shows the first page of a travel profile screen **100** which allows the user to select actions that take place while the user is traveling. Travel profile screen **100** includes title bar **105** indicating that the user is viewing the first page of the travel profile. Travel profile screen **100** also includes menu bar **110**. Menu bar **110** includes drop-down menu items for printing, saving the profile, editing profile information, changing the profile view, using profile-related tools, and receiving help. Travel profile screen **100** includes tabbed dialogs **115** for the various trips the user is scheduled to take. Tabbed dialogs **115** is currently showing information related to the users "Trip to Tampa." If the user selected the "Convention in LA" profile, information for that trip would be displayed. While this embodiment shows a tabbed dialog for organizing and presenting information, other organizational methods, such as frames or command buttons, could also be used to organize the user's trip information. To add or remove a trip from the tabbed dialog, for example in response to a change in travel plans, the user would select the "File" menu item and select "New," "Remove," "Rename," or "Copy" within the File menu choices. The

"Copy" option allows the user to copy the information for another trip.

The travel dates for the Trip to Tampa are shown using start date **120** combo box and end date **125** combo box. When the user presses the down-arrow to the right of the control, a calendar is displayed to the user for selecting the appropriate date.

Check box **130** is checked by the user if the user wishes to notify home parcel services while the user is away. When check box **130** is selected, parcel service delivery options **135** become enabled. The user then selects either option **140** to have the parcel services instructed to hold packages until the user returns, option **145** to instruct the parcel services to deliver packages to the user at a future date. The delivery date defaults to end date **125** but may be changed by the user if needed. Again, if the user selects the down-arrow beside the delivery date a calendar is displayed allowing the user to select the desired delivery date. When checked, Option **150** instructs the parcel services to leave packages with a neighbor until a future date. In the example shown, Option **150** has been selected as indicated by the black selection mark appearing in Option **150**. The date shown for option **150** again defaults to end date **125** but can be changed by the user to indicate a different date. Neighbor drop-down box **155** allows multiple neighbors to be stored in the system so that future neighbor settings can be selected without entering the necessary neighbor information. Neighbor text box **160** shows the neighbor information corresponding with the selected neighbor and can be edited by the user as

needed. In this manner, the user can select from stored neighbor addresses without having to repeatedly enter information pertaining to a particular neighbor. In addition it would be possible to have a first neighbor contact followed by a second, and other neighbors so that packages that need to be signed for can be delivered if the first neighbor is away. Note that option **150** may also be used to forward packages to the user by specifying an indefinite end date and by entering information about the user's forwarding address in the neighbor text box **160**.

Check box **165** is used to notify a company mailroom when the user is traveling. The company mailroom contact information is entered by the user by using the "Tools" menu item within menu bar **110**. When check box **165** is selected (as shown by the "x" in **Figure 1**), mailroom delivery options **170** are enabled to allow the user to select a delivery option. Option **175** is selected to hold the company mail in the mailroom indefinitely, for example until the user changes the selection to forward the kept mail or to deliver the mail (options **180** and **185**). Option **175** may be selected when the user is not sure when he will be returning or does not know the address of a forwarding location where the user will be staying. Option **180** is similar to option **145** whereby the mail is held and then delivered on a given date. Likewise, option **185** is similar to option **150** whereby the mail is forwarded to another location until a future date. The future date defaults to the scheduled end date **125** but may be changed by the user as needed. Drop-down box **190** allows the user to select a forwarding location. Forwarding location text box **195** shows the corresponding address information for the

forwarding location. Forwarding locations can be preset, for example with addresses of other company sites, and can also be customized by the user. By storing the forwarding location information, the forwarding address information does not need to be re-entered when the user is traveling to the same location again.

Figure 2 shows the second page of travel profile screen **100** used to allow the user to select actions that take place while the user is traveling. Travel profile screen **100** includes title bar **201** indicating that the user is viewing the second page of the travel profile. Travel profile screen **100** also includes menu bar **110**. Menu bar **110** includes the same drop-down menu items as provided on page 1 of the travel profile screen (see **Figure 1**). Travel profile screen **100** also includes the same tabbed dialogs **115** as were present for page 1 of the profile. Tabbed dialogs **115** is currently showing information related to the users "Trip to Tampa." If the user selected the "Convention in LA" page 2 profile information for that trip would be displayed. To add or remove a trip from the tabbed dialog, for example in response to a change in travel plans, the user would select the "File" menu item and select "New," "Remove," "Rename," or "Copy" within the File menu choices.

Check box **206** is checked by the user if the user wishes to configure his telephone while the user is away. When check box **206** is selected, telephone configuration options **207** become enabled. Check box **208** indicates whether the user wants the system to set a voice mail greeting while the user is away. Greeting start date **210**

defaults to travel start date **120** specified for the trip. Greeting start date **210** can be modified by the user to select a date that is either before or after the start date. Stored greeting message box **215** specifies a named greeting to use while the user is away. The drop down button to the right of greeting message box **215** is used to select from predefined greetings the user has stored. When the drop down button is selected, a list box is displayed showing the other greetings from which the user can select. In the example shown, a greeting named "Sales convention in Tampa" has been selected. While this greeting is specific for a certain trip, a more generic "out of office" message may also be configured and used. In addition, a generic out of office message may be used with the computer supplying the start and end dates of the trip. For example, the user could provide a message such as "Hi, you've reached John Doe's voice mail. I will be out of the office from [start_date] to [end_date]. If this is an emergency, please contact [backup_contact]." The variables in brackets ([]) may be supplied by the computer using audio phases previously stored by the user.

Option **220** is used to have the system set the voice mail greeting upon the user's return to the office. Again, the user can specify a start date **225** that he wishes for the "in office" greeting to be set. Start date **225** defaults to the end date of the trip, but may be modified as necessary by the user. The user can select from a list of greetings **230** to use for the in-office greeting. Here, the user has chosen the "Standard in Office Message" for the greeting message upon the user's return.

Option **235** allows the user to request phone calls be forwarded to a specified phone number **240**. The user can also specify the types of phone calls to be forwarded by using drop down box **242**. In the example shown, only "Internal" calls will be forwarded to phone number **240**. Other, non-internal phone calls will be received by the voice mail system and the caller will hear the predefined greeting (greeting **215** or greeting **230**, depending upon the date of the call). Other types of calls that could be provided in drop down box **242** would include "External" calls and "All" calls. The company's internal telephone switch (i.e. a PBX) would have the ability to distinguish between external and internal calls and handle each appropriately. The call forwarding start date **243** defaults to trip start date **120** and the call forwarding end date **244** defaults to the trip end date. Each of these dates can be altered as needed by the user. Specifying a call forwarding end date **244** prevents the user from being back in the office and forgetting to un-forward the user's phone.

Option **245** allows the user to specify a backup contact that will provide backup service for the user while the user is away. A backup name **250** is provided and can be saved along with a backup phone number **255**. In this manner, multiple backup contacts and their respective phone numbers can be saved for future use. In some voice mail and company phone systems, a caller is presented with an option to press a certain key to be connected with a backup person. Backup phone number **255** can be used to automatically connect a caller with a backup contact when

the user presses the predefined telephone key combination (e.g., the pound sign (#)).

Option **260** allows the user to specify an emergency contact that will provide information in case of an emergency. An emergency contact name **262** is provided and can be saved along with an emergency contact phone number **264**. In this manner, multiple emergency contacts and their respective phone numbers can be saved for future use. The information can be used by emergency workers in case of an emergency with the individual. Option **266** allows the user to include destination contact name **268** and corresponding destination contact phone number **270** so that the user's family and colleagues can contact the user at his travel destination. Emergency, destination, and backup contact information could be included in the user's telephone voice mail message or downloaded to the user's mobile telephone or personal digital assistant (PDA). Such information could also be included in contact messages that are sent to the user's family and business contacts (see **Figure 10**).

Option **272** is selected to update the user's electronic calendar with information pertaining to the trip. This calendar information reminds the user about the trip and can also be used to print out trip information (i.e. flight times and flight numbers, rental car reservation information, hotel information, etc.) useful to the user when traveling. This information can also be used by the user's colleagues when scheduling meetings or trying to reach the user. Colleagues such as managers and secretaries may have access to view the detailed calendar entries in order to track down the user if needed. Other

colleagues may only see that the user is out of the office during the given dates and the name / phone number of the user's backup.

Option **274** is used to request that emergency and HMO information be downloaded for the user. Health profile command button **276** is used to specify the user's insurance and other health preferences. When option **274** is selected, the system searches a database of health care information available for the travel destination. In the example shown, health care information for Tampa, Florida would be searched and matched against the user's health care profile. In this manner, the user will know the address and driving instructions for Tampa area hospitals and emergency rooms. Those health care providers that have been approved by the user's HMO or health insurance company are also indicated. In addition, GPS coordinate data is also downloaded for use in a GPS system.

Option **278** is used to inform colleagues, family, friends, and associates of the user that the user will be away. Contact list command button **280** is used to specify various classes of contacts to be notified. Contact list command button **280** allows the user to select contacts from contact lists available to the user, such as a distribution list, contacts from the user's email program, or company provided email lists. Depending upon the type of recipient, various information can be provided. For example, the user may specify that close friends and family receive an email including all the travel details. Business colleagues, on the other hand, may receive an email including a limited subset of information letting

them know that the user is in Tampa at a sales convention. Clients or customers may only receive an email that the user is out of the office and letting them know whether their emails will be received while the user is away and the name / phone number of the user's backup.

Option **282** allows the user to transfer money to an electronic wallet or other type of debit card. The amount of money to transfer is specified in text box **284**, in this case the user has requested that $250 be transferred. Select Accounts command button **286** is used to select the user or company bank account from which to transfer money and the electronic wallet or debit card information to which the money is transferred.

Option **288** allows the user to have driving information and GPS data downloaded to a GPS device. GPS data regarding the destination, in this case GPS data regarding the Tampa, Florida area is downloaded. The downloaded information may be in the form of an email attachment or may be a file transfer directly to a device accessible by the user. The destination address for the downloaded information is specified using the "Tools" option within menu bar **110**. The address to which the information is downloaded is provided in a customization option. As a default, the information is emailed to the user using the email address specified for the user.

Option **290** downloads information regarding various civic events, cultural events, or area attractions to the user. Information can include driving directions to the event that can be loaded into the user's GPS device. This information is retrieved from a database of area

attractions. In this case, information regarding events in route as well as in and around Tampa is selected for the time period that the user will be in the Tampa area. The event information can be further filtered by the user by selecting the "Tools" menu item within menu bar **110** and customizing the attractions for which the user has an interest. In this way, information about operas will not be provided to the user unless the user has indicated an interest in operas.

Option **292** is used to download information for restaurants in the travel destination. Again, the user can customize the restaurant preferences using the "Tools" menu item within menu bar **110**. Restaurant preferences can limit selections based on type of food (e.g., Mexican, Chinese, etc.), style of food (e.g., fast food, casual, formal), and distance from the user (i.e. only restaurants within a 5 mile radius). The distance parameter can be calculated based upon the distance restaurants are from the user with a GPS device or the distance restaurants are from the user's hotel or other location.

Option **295** is used to send a message to the user's newspaper or carrier and request that the newspaper not be delivered while the user is away.

Option **293** is used to manage home automation settings, for example using the X-10 home automation protocol, while the user is away and upon his return. Home automation configuration button **294** is used to select what activities the user wants automatically performed while the user is away and while the user is at home. Home automation solutions often use a PC or a home automation device to

store profiles for use by the system. A "home" profile setting includes the home automation functions that the user wishes to have performed while the user is in town, while the "away," or "out of town," profile provides functions the user wishes to have performed while traveling. Home automation settings can be used to turn appliances and lights on or off at certain times and can further be used in conjunction with a home security system to provide security functions. Configurations can be saved so that the user can retrieve prior established settings without having to re-enter the automation details. Away date **296** specifies the date that the away automation settings begin while home date **298** specifies the date that the at-home automation settings will be restored. These dates default to start date **120** and end date **125**, respectively. Away date **296** and home date **298** can be altered from the default dates by selecting the down arrow beside the respective dates and choosing a different date.

Figure 3 shows a high level diagram of the activities involved with user **300** interacting with travel agent **320** to perform various actions. As used herein, a travel agent includes an on-line travel agent, such as Expedia™ available on the Internet, a traditional travel agent with human agents, or a PC based travel agent program that is programmed to make travel arrangements by contacting various travel services. User **300** is shown using a hand held computing device **310** to receive and send information to travel agent **320.** A hand held computing device is advantageous because of its portability, however other types of computing devices such as laptop computers,

pervasive computing devices, mobile telephones, and the like can be used as computing device **310**.

Travel agent **320** maintains user profile **315** that was established by the user to include the user's travel preferences (see **Figures 1** and **2**). Travel agent **320** is either an automated agent, such as an online travel agent, or alternatively is a non-automated travel agent with human agents that assist customers with their travel plans. Once a travel plan has been initiated, travel agent **320** packages actions based upon user profile **315** settings and transmits the actions to various automated agents to perform the requests on behalf of user **300**. Calendar update actions **325** are transmitted to computer **330** and update the user's electronic calendar. Withdraw cash action **335** is transmitted to the user's financial institution whereupon the balance of the user's electronic wallet **340** or debit card is increased and the selected bank account is decreased. Itinerary action **345** is transmitted to an email distribution agent that transmits email to distribution lists **350** based upon the recipients' relationship with user **300**. For example, one distribution list may be used to send complete itinerary information to the user's family and secretary. A second distribution list may be used to send summary information to the user's colleagues, and a third distribution list may be used to send emails to the user's customers or clients letting them know that the user will be out of the office and the name / phone number for the user's backup.

Home automation package **355** includes home automation settings and is sent to the user's home **360** for use by the

user's home automation system. When the user is away, a profile configured to, for example, turn lights on and off while the user is away is used to configure the home automation system. Likewise, when the user is scheduled to return, a second automation profile is sent to the user's home with automation instructions the user uses while he is at home.

Mailroom actions **365** are transmitted to the company mailroom **370** using email or another protocol used by the mailroom for receiving instructions. The mailroom will now know whether to hold the user's mail, forward it to another location, or deliver the mail to the user upon his return. Parcel service action **375** likewise informs the common home parcel services **380** used by the user that parcel deliveries should be left with a neighbor, held for customer pickup, or delivered when the user returns. Postal service action **385** likewise informs the post office branch serving the user that mail services should be stopped, delivered when the user returns, or forwarded to another address. Mailroom actions **365**, parcel service actions **375**, and post office actions **385** may alternatively use encryption and digital signatures or digital certificates to verify that the user has authorized the mail instructions and for security regarding the user's whereabouts.

Telephone configuration actions **395** are transmitted to a computer system connected to the user's phone or to the company's telephone switch using a protocol understood by the telephone or switch **398**. Telephone configuration actions **395** are used to configure the user's telephone by forwarding calls to another number, changing the voice mail

greeting, and/or changing the backup or emergency contact information.

Computing device **310** is used to receive area emergency and health provider information, receive GPS information and driving directions, receive civic, cultural, and attraction information, and receive restaurant information. Ideally, computing device **310** also has GPS capabilities and wireless communication capabilities allowing the device to receive data easily and the ability to use downloaded GPS data.

Figure 4 shows a data flow diagram of the processes, data stores, and entities involved in the system and the data flowing among the various processes, stores, and entities. User **400** sends travel requests and preferences **408** to travel agent **410** using a standard protocol such as HTTP, secure-HTTP (HTTPS), file transfer protocol (FTP), or an email protocol (i.e. MIME). Travel agent **410** receives the request and/or preferences and processes them. Travel preferences data flow **411** are sent to update profile process **414** which responsively stores updates **419** in user profile **420**. Travel request parameter data flow **412** is sent to arrange travel process **415**. Arrange travel process **415** reads user profile data store **420** and receives travel preferences data flow **421**. Arrange travel process **415** stores un-booked travel data **422** in itinerary data store **425**. Arrange travel process **415** sends travel package data flow **428** to user **400** for optional confirmation action. User **400**, in turn, provides confirmation data flow **434** to book travel process **435**. Book travel process **435** reads un-booked travel data **432** from itinerary data store **425**. Book

travel process books the travel with service agents (i.e. airlines, hotels, rental cars) and prepares possible automated actions (called "virtual actions," or "vActions"). vAction data **438** is stored in vAction data store **440**. Package vAction process **445** reads action data **442** from vAction data store **440** and packages the set of vActions. The packaged vAction data **448** is stored in travel package data store **450**. Send vTravel package process **455** reads packaged actions **452** from travel package data store **450** and in turn sends executable vTravel actions **456** to user **400**. User **400** has an opportunity to accept or reject actions that have been prepared, packaged, and delivered to the user. Accepted action data **458** corresponding with accepted actions is sent to execute vActions process **460**. vActions process **460** sends itinerary data flow **462** to email recipients **465**. vActions process **460** also sends health, directions, GPS data, restaurant data, and points of interest data **468** to the user's computing device **470**, preferably a hand held network-connected mobile computing device with GPS capabilities. vActions process **460** also sends funds transfer data flow **472** to banking system **475**, preferably using a secure channel such as an encrypted data stream. vActions process **460** also sends calendar data **478** to electronic calendar system **480** for updating the user's electronic calendar. vActions process **460** also sends automation settings **482** to the user's home automation system **485** to control household processes. vActions process **460** also sends home mail instructions **488** to the user's home mail office and parcel service providers **490**. vActions process **460** also sends business mail instructions **492** to the company's mailroom **495**. Finally, vActions process **460** sends phone

configuration data **496** to the user's home and or business phone system **498** for configuring the user's phone.

Figure 5 shows a flowchart for processing a user's travel request and notifying service agents. Travel agent processing commences at **500** and user processing commences at **505**. The user sends a travel request to the travel agent (step **510**). The travel agent receives the user's travel request (step **515**). The travel agent then retrieves and reads the user's travel profile information (input **520**). The travel agent processes the user's travel request (step **525**). Part of the user's travel profile includes whether the user wishes to confirm actions. If the user wishes to confirm actions, decision **530** branches to "yes" branch **535**.

Following "yes" branch **535**, the travel agent sends a confirmation request to the user (step **540**). The user receives confirmation request (step **545**) and sends a confirmation response (step **550**). The travel agent receives the confirmation response (step **555**) and determines whether the user confirmed the action. If the user confirmed the action, decision **560** branches to "yes" branch **565** whereupon the service agents are instructed to perform the preferred actions (step **580**). The user can confirm some actions and decide to skip other options. In addition, the user can choose to have some actions automatically performed while other actions will require the user's confirmation before processing. On the other hand, if the user did not confirm the actions, decision **560** branches to "no" branch **570** and bypasses step **580** notifying the service providers.

The system can receive changes to the user's travel plans from a variety of sources. The user can phone his travel agent to make travel plans. The user can use a wireless communication device to indicate changes to his travel plans while traveling. In addition, the user can use a voice activated system that provides instructions to the automated travel agent concerning changes to the user's travel plans. Finally, the user can make travel changes using a network connected computing device to contact the travel agent and indicate the necessary changes. The ability to handle changes while the user is traveling keeps the user's travel data up to date and better serves both the user and the user's contacts.

Data transmitted between the user's computing device and any third party computing device, such as the travel agent, is preferably protected if such information contains any personal, confidential, or financial information. Information can be protected using public key / private key encryption as used in Secure Socket Layers (SSL) or using encryption using digital certificates.

If decision **530** does not require confirmation, "no" branch **575** is taken whereupon the service agents are instructed to perform the preferred actions (step **580**). Once the user has established a profile (see **Figures 1** and **2**), the actions he wishes to have performed can be invoked automatically without any further need of user involvement. In this way, busy users do not need to concern themselves with these automated travel actions. After the service agents have been so notified, processing terminates at end **595**.

Figure 6 shows a flowchart for configuring a user's telephone in response to a user's travel plans and travel profile. Travel agent processing commences at **600**, the user's email system processing commences at **605**, and telephone system processing commences at **610**. Before the telephone system is automatically configurable, the telephone system registers with the user's email system (step **615**). The user's email system receives the registration (step **620**) and processes the registration, saving details regarding communication with the telephone system (step **625**). Details include the address of the voice mail system and any password or security information needed to change voice mail settings. If the telephone system is a home answering machine, registration would include the phone number needed to contact the answering machine, access codes (i.e. a personal identification number entered from the telephone touch pad) needed to change answering machine settings, and configuration codes entered from the telephone touch pad used to select answering machine options, such as options to change the greeting message. Telephone system **610** may also be a PC based telephone system that receives phone calls using a modem connection and saves messages on nonvolatile storage, such as the hard drive, connected to the PC. A PC based telephone answering system may be more tightly coupled with an email system residing on the same PC, making configuration of the telephone answering system easier than remote systems such as voice mail systems and answering machines. The travel agent receives a travel request (step **630**) and reads the user's travel profile information (input **635**). The travel agent creates a travel plan (step **640**) including actions the user prefers to execute while

traveling. The travel plan is sent to the user's email system (step **645**) before travel agent processing terminates at **650**. The user's email system receives the travel plan and packaged actions from the travel agent (step **655**).

Throughout this application, an email system is shown receiving messages from the travel agent and other systems for processing. While an email system is shown, any system capable of receiving data from a third party transmission and processing the data will meet the processing requirements. For example, a file transfer protocol (FTP) site can be set up on a PC that receives and processes files that are sent to the PC. An email example is used herein because, unlike FTP or other solutions, many PCs include an email application. Actions are included as attachments to an email message. These attachments are preferably encrypted and digitally signed. The message is digitally signed by encrypting the attachment using the sender's (i.e. the travel agent's) private key. Anyone can decipher the message using the sender's public key. A successful decipher of the message helps to guarantee that the sender is really who sent the message and not an imposter. The message is also encrypted using the receiver's (the user's PC) public key. Since the user is the only one with the corresponding private key, only the user's PC can decipher the message, thus keeping the message private from any potential eavesdroppers or interceptors. When an email with an attachment arrives, the PC detects the message and deciphers any attachments using both the sender's public key and the PC's own private key. If the attachment is successfully deciphered, the action enclosed in the attachment is performed, either

immediately or after the user confirms that he wishes to execute the action.

The user decides whether to accept the actions (decision **660**). If the user does not accept the action, "no" branch **690** is taken and email system processing ends at **695**. On the other hand, if the actions are accepted, decision **660** branches to "yes" branch **665** which notifies the telephone system (step **670**) using the pre-defined protocol established during telephone system registration (steps **615** to **625**). The user's email system processing ends at **695**. The telephone system receives the travel data instructions from an email system (step **675**). These instructions are used to set the user's telephone to a travel environment (step **680**). The travel environment is either configured and saved in the telephone system or the configuration data is sent from the email system to the telephone system using a secured transmission protocol (i.e. Secure-HTTP (HTTPS)). After the user's telephone has been set, telephone system processing terminates at **685**.

Figure 7 shows a flowchart for automatically updating a user's electronic calendar in response to a user's travel plans. Travel agent processing commences at **700** and user or assigned delegate processing commences at **705**. The user may specify a delegate to receive and accept calendar entries in the user's absence. For example, a user's secretary may receive and process calendar entries on behalf of the user. Calendar processing commences with the travel agent processing a user's travel request. The user's travel profile is read (input **710**) to determine whether automatic calendar entries are desired by the user.

The travel agent then makes travel arrangements on behalf of the user (step **720**) and saves the travel related information, such as hotel information, flight information, and rental car information. If the user does not desire automatic calendar entries, decision **730** branches to "no" branch **755** bypassing calendar entry steps and terminating calendar update processing at **795**. On the other hand, if automatic calendar updating is preferred by the user, decision **730** branches to "yes" branch **735** whereupon calendar entries (called "vCalendar" entries) are created (step **740**). The vCalendar entries are sent to the user or the user's assigned delegate (step **750**) before travel agent processing of calendar entries terminates at **795**. The user or assigned delegate receives the vCalendar entries in the form of an email or other data transmission (step **760**). If the user requested (in the user's profile) that vCalendar entries be approved before updating the calendar, then the user reviews the calendar entries before they are used to update the user's electronic calendar. If the user accepts the calendar entries, or a subset thereof (decision **770**), then "yes" branch **775** is taken whereupon the vCalendar entries are used to update the user's electronic calendar (step **780**) before processing terminates at **790**. On the other hand, if the user does not accept the calendar entries, "no" branch **785** is taken bypassing the calendar update step and processing terminates at end **790**.

Figure 8 shows a flowchart for preparing and downloading emergency and medical information based on the user's profile and travel plans. Travel agent processing commences at **800** and user processing commences at **805**. Health processing commences with the travel agent

processing a user's travel request. The user's travel profile is read (input **810**) to determine whether health information is desired by the user. The travel agent then makes travel arrangements on behalf of the user (step **820**) and saves the travel related information, such as hotel information, flight information, and rental car information. The travel agent also saves addresses related to the user's hotel and other travel destinations. If the user does not wish to receive health information, "no" branch **865** is taken and processing terminates at **895**. On the other hand, if the user has selected medical preferences, such as insurance company providers, preferred hospitals, request for emergency/health information, etc., decision **830** branches to "yes" branch **835**. The travel agent uses the user's destination address(es) and health provider preferences and matches these against a medical services database to identify health providers near in proximity to the user's travel destinations and that match the user's health criteria, such as acceptance of a particular health insurance plan. This identification is used to prepare a travel package containing the identified health information (step **850**). After the travel package has been prepared, it is sent to the user (step **860**) before travel agent processing terminates at **895**.

The sent travel package can be emailed, faxed, or downloaded to the user (step **870**). The user receives the travel package data (step **880**). Preferably, the travel package data includes GPS coordinate data to be used by a user's GPS device to direct the user towards the closest medical provider and provide the user with directions to such provider. After the travel package has been received

by the user it is available for use by the user during the user's travels. The user processing then terminates at **890.**

Figure 9 shows a flowchart for preparing and downloading personal interest information based on the user's profile and travel plans. Travel agent processing commences at **900** and user processing commences at **905.** Point of interest processing commences with the travel agent processing a user's travel request. The user's travel profile is read (input **910**) to determine whether civic / cultural events and attraction information is desired by the user. The travel agent then makes travel arrangements on behalf of the user (step **920**) and saves the travel related information, such as hotel information, flight information, and rental car information. The travel agent also saves addresses related to the user's hotel and other travel destinations. If the user does not wish to receive civic / cultural events and attraction information, "no" branch is taken and processing terminates at **995.** On the other hand, if the user has requested civic / cultural events and attraction information, decision **930** branches to "yes" branch **935.** The travel agent uses the user's destination address(es) and civic / cultural events and attraction preferences and matches these against a civic / cultural events and attraction information database to identify civic / cultural events and attraction information near in proximity to the user's travel destinations and that match the user's civic / cultural events and attraction preferences, such as interest in opera or museums. This identification is used to prepare a travel package containing the identified civic / cultural events

and attraction information (step **950**). After the travel package has been prepared, it is sent to the user (step **960**) before travel agent processing terminates at **995**.

The sent travel package can be emailed, faxed, or downloaded to the user (step **970**). The user receives the travel package data (step **980**). Preferably, the travel package data includes GPS coordinate data to be used by a user's GPS device to direct the user towards the desired civic / cultural event, or attraction and provides the user with directions to such event or attraction. After the travel package has been received by the user it is available for use by the user during the user's travels. The user processing then terminates at **990**.

Figure 10 shows a flowchart for notifying various classes of people in the user's contact list regarding the user's travel plans. Travel agent processing commences at **1000** and user processing commences at **1005**. The user creates one or more traveler's contact lists (TCLs) that are used to inform others that the user is out of the office (step **1010**). TCLs are similar to distribution lists and contain contact information, such as email addresses, for people the user would like to contact. TCLs may be made from scratch or may be created from existing contact information contained in the user's personal information manager (PIM), electronic address book, or company maintained email lists. Once the TCLs have been created, they are sent to the travel agent (step **1015**) to be stored with the user's travel profile information. The travel agent receives the TCLs from the user and updates the user's profile using the TCL information (step **1020**). The

travel agent then receives travel instructions for the user's next travel plan and makes the corresponding travel arrangements (step **1025**). The travel agent reads the user's profile including the user's desire to send travel information to various contacts (input **1030**). The travel information pertaining to the user's scheduled trip is filtered based upon the recipient class (step **1035**). For example, the user's spouse and secretary may be sent complete travel details (step **1040**). This information is in turn received (step **1045**) by the user's family recipient class (class **1055**). Certain business associates of the user are sent business-level itinerary information (step **1060**), for example the name of the conference that the user is attending, but not the specific hotel and flight information. This information is in turn received (step **1065**) by the user's business associates (class **1070**) who are included in the user's business-level TCL. Finally, an "out of office" message is sent (step **1075**) to clients and other individuals that may need to know whether the user is available (and the user's backup) but do not need to know the user's travel plans. This information is in turn received (step **1080**) by the user's clients and other friends (class **1085**) who are included in the user's non-business level TCL. After the various classes of messages have been sent, processing terminates at **1095**.

Figure 11 shows a flowchart for configuring a user's home automation system based on the user's profile and travel plans. Travel agent processing commences at **1100**, email system processing commences at **1105**, and home automation processing commences at **1110**. The home automation system registers with the email system (step

1115) providing the email system with an address and other information about the home automation system. The email system receives the home automation system registration (step **1120**) and processes the registration (step **1125**) by setting configuration settings and other values associated with contacting and instructing the home automation system. When the travel agent receives a travel request (step **1130**) it reads the user's travel profile (input **1135**) to determine whether the user desires that home automation settings be automatically configured when the user is away. If the user desires automatic home automation settings, the travel agent creates a travel plan (step **1140**) that includes the user's desired home automation profile. The travel plan is then sent (step **1145**) to the user's email system for further processing before travel agent processing terminates at **1150.** The user's email system receives the travel plan (step **1155**) that includes home automation actions. If the user has chosen to manually accept actions, decision **1160** is processed by receiving a confirmation from the user. If the user accepts (or if the user has chosen to have the actions processed without manual confirmation), "yes" branch **1165** is taken and a message notifying the home automation system is prepared and sent (step **1170**). On the other hand, if the user does not accept the home automation action, "no" branch **1190** is taken. Email system processing terminates at **1195.**

Home automation system **1110** receives the home automation instructions from the user's email system (step **1172**). For security reasons, the data is sent using a secure protocol, such as an encrypted message or using a secure-HTTP (HTTPS) protocol. The home automation system

may reside on the user's PC or may be a separate home automation device that is sent instructions from a PC or telephone. The PC or home automation device contains profiles that can be activated remotely using a password or personal identification number (PIN). If the email system and the home automation device reside on the same PC or on the same secured local area network (LAN), then the email system can receive the attachment containing the home automation action and process it accordingly. If, however, the email system is remote from the home automation system, then the PC running the email system contacts the home automation system using a secure link. The secure link can be using encrypted messages much like the way the email system receives attachments (see **Figure 6**), or may be a telephone connection that is placed to the home automation system whereby the home automation PIN code is entered and the necessary touch tone signals are delivered to activate the desired profile. The home automation system can be activated remotely by the email system. The action may request that the home automation system turn itself on. Decision **1174** determines whether the system should turn on. If it should turn on, "yes" branch **1175** is taken whereupon the system is activated if the system is not already activated (step **1176**). If the system is being requested to turn off, "no" branch **1177** is taken whereupon the system is deactivated (step **1178**). In this manner, the home automation system can be remotely activated in case the user had to travel suddenly and did not have the opportunity to turn the home automation system on manually before leaving his home.

The home automation system may receive a simple command instructing the system to enter an "at-home" or "away" configuration or may receive more complicated instructions identifying particular home automation functions to perform. Using a simple example, if the home automation system is instructed to enter an "away" configuration, decision **1180** branches to "yes" branch **1184** whereupon the home automation system activates the travel environment profile (step **1188**). On the other hand, if the home automation system is instructed to enter an "at home" configuration, decision **1180** branches to "no" branch **1182** whereupon the home automation system activates the at-home environment profile (step **1186**). After the home automation environment has been set, home automation terminates at **1190** until further instructions are received. The system automatically returns to the home profile setting when the user's trip is completed as indicated by the travel end date.

Figure 12 shows a flowchart for preparing and packaging actions and sending packaged actions to the user for confirmation. Travel agent processing commences at **1200** whereupon a travel request is received (step **1205**), typically from the user. The travel agent reads the user profile (input **1210**) to determine which actions the user wishes to have performed when the user is traveling. Based on the profile information, the travel agent creates a variety of actions (vActions)(step **1215**). If the user desires to have his electronic calendar updated, the system creates a calendar vAction (step **1220**). If the user desires to have his home packages handled, the system creates a home packages vAction (step **1222**). If the user

desires to have his business packages handled, the system creates a business packages vAction (step **1224**). If the user desires to have his home automation system automatically configured, the system creates a home automation vAction (step **1226**). If the user desires to have his telephone configured, the system creates a telephone vAction (step **1228**). If the user desires to have contacts informed that the user is away from the office, the system creates an itinerary notification vAction (step **1230**). If the user desires to have funds transferred to his electronic wallet or debit card, the system creates a funds transfer vAction (step **1232**). If the user desires to receive health provider information pertaining to the user's travel destination, the system creates a health provider vAction (step **1234**). If the user desires restaurant information pertaining to the user's travel destination, the system creates a restaurant vAction (step **1236**). If the user desires to receive points of interests regarding cultural events, civic events, and area attractions pertaining to the user's travel destination, the system creates a points-of-interest vAction (step **1238**). Finally, if the user desires driving directions and GPS data corresponding with the user's travel destination, the system creates a driving directions / GPS vAction (step **1240**).

The vActions that are created are packaged together for transmission to the user (step **1245**). The packaged vActions are transmitted to the user (step **1250**) before travel agent processing terminates at **1255**. User processing commences at **1260** whereupon the user receives the travel package (step **1270**). The user optionally

accepts or rejects the various vActions included in the package (step **1280**). The accepted vActions are then executed at the appropriate time (step **1290**) to facilitate the user's travel desires before user processing is terminated at **1295**.

Figures 1 - 12, described above, show various ways of performing travel related actions on behalf of a user. In one embodiment, the user's calendar is used to receive travel related information for keeping the user and others informed regarding the user's travel plans. As described in **Figures 1 - 12**, the actual travel reservations can be made by any travel agent (i.e. an automated travel agent, a traditional human travel agent, etc.). **Figures 13 - 20**, described below, show an example of optimizing travel reservations. One way travel reservations are optimized, as explained in further detail below, is by using the user's calendar system to request travel reservations and then using a computer system to receive and optimize possible travel plans based upon user preferences (i.e. minimizing travel costs).

Figure 13 shows travel profile screen **1300** used for selecting travel options by a user. Travel profile screen **1300** includes title bar **1302** and menu bar **1304**. Menu bar **1304** includes a "File" menu option which would further include the ability to add a new profile to the calendar, the ability to delete an existing profile, and the ability to copy profile data to another profile for further optimization and processing. Tabbed dialogs **1306** include preferences for business and personal travel. When the user is traveling for business, a faster flight may be more

important than a lower airfare. Conversely, when making personal travel plans, the lowest airfare may be more important than arriving at a particular time. In addition, as will be explained further below, the business travel may be tied to a set of business policies and rules that do not apply when the user is paying for the travel out of his own pocket. Additional tabbed dialogs can be included for other types of travel, such as preferences when traveling with children. Preference ranking **1305** allows the user to rank the importance of general travel categories. The general travel categories shown include airline preferences **1308**, hotel preferences **1330**, and ground transportation preferences **1350**. Preference ranking **1305** shows that airline preferences **1308** rank ahead of hotel preferences **1330** and ground transportation preferences **1350**. Preference ranking **1305** further shows that hotel ranking **1330** ranks ahead of ground transportation preferences **1350**. Rankings are further made for preferences within categories. Airline preference rankings **1310** allows the user to rank the choices within airline preferences **1308**. Hotel preference rankings **1332** allows the user to rank the choices within hotel preferences **1330**, and ground transportation preference rankings **1352** allows the user to rank the choices within ground transportation preferences **1350**.

Airline preferences **1308** includes airline list **1322** which allows the user to order the airlines by preference. Frequent flier information is also listed for programs in which the user is enrolled. Add command button **1312** allows the user to add a new airline to airline list **1322**. Edit command button **1314** allows the user to edit an existing

airline, for example by adding a newly obtained frequent flier number. Delete command button **1316** allows the user to delete an airline from airline list **1322**. Move up command button **1318** allows the user to select an airline within airline list **1322** and move the airline up in the user's preference order. Each time move up command button **1318** is pressed the airline moves up one place in airline list **1322**. On the other hand, each time move down command button **1320** is pressed, the airline that has been selected moves down one position. Airline class drop down box **1324** allows the user to select his preferred class for flying. The user may select "business" class for business travel tabbed dialog **1306** and "coach" class for personal travel tabbed dialog **1306**. Seat preference drop down box **1326** allows the user to specify the type of seat preferred by the user (i.e. "aisle," "window," etc.). Airline preferences **1308** also includes price, total flight time, and number of stops. Airline preference rankings **1310** allow the user to assign the level of importance to items within airline preferences **1308** (i.e. airline, travel class, price, total flight time, number of stops, and type of seat).

Hotel preferences **1330** includes hotel list **1344** which allows the user to order the hotels by preference. Frequent guest information is also listed for hotels in which the user is enrolled. Add command button **1334** allows the user to add a new hotel to hotel list **1344**. Edit command button **1336** allows the user to edit an existing hotel, for example by adding a newly obtained frequent guest number. Delete command button **1338** allows the user to delete a hotel from hotel list **1344**. Move up command

button **1340** allows the user to select an hotel within hotel list **1344** and move the hotel up in the user's preference order. Each time move up command button **1340** is pressed the hotel moves up one place in hotel list **1344.** On the other hand, each time move down command button **1342** is pressed, the hotel that has been selected moves down one position. Maximum hotel room rate drop down box **1345** allows the user to select a preferred maximum amount he is willing to spend on a hotel room per night. Hotel star rating drop down box **1346** allows the user to select his preferred quality rating for hotels. The user may select "4-Star" hotels for business travel tabbed dialog **1306** and "2-Star" hotels for personal travel tabbed dialog **1306.** Proximity drop down box **1348** allows the user to specify the distance the hotel should be from the destination. When entering the trip information, the user enters a destination address and indicates whether the destination is a conference. If the destination is a conference, conference information is provided using the "Tools" option under menu **1304** in order to search conference pricing which is often discounted for staying at a particular hotel, flying on a particular airline, and/or obtaining certain ground transportation. Hotel preference rankings **1332** allow the user to assign the level of importance to items within hotel preferences **1330** (i.e. hotel chain, room rate, non-smoking room preference, star rating, proximity preference, high speed Internet service, hotel restaurant, workout facility, complimentary facsimile service, complimentary local phone calls, complimentary breakfast or other meals, and transporation to and from the airport). Other hotel options, such as size of bed preference, can also be included within hotel preferences **1330.**

Ground transportation preferences **1350** include rental car list **1364** which allows the user to order rental car providers by preference. Rental car member numbers are also listed for rental car companies with which the user is enrolled. Add command button **1356** allows the user to add a new rental car company to rental car list **1364**. Edit command button **1357** allows the user to edit an existing rental car company, for example by adding a newly obtained rental car member number. Delete command button **1358** allows the user to delete a rental car company from rental car list **1364**. Move up command button **1360** allows the user to select a rental car company within rental car list **1364** and move the rental car company up in the user's preference order. Each time move up command button **1360** is pressed the rental car company moves up one place in rental car list **1364**. On the other hand, each time move down command button **1362** is pressed, the rental car company that has been selected moves down one position. Rental car preferences command button **1354** opens a separate window allowing the user to specify rental car preferences (type and model of car, price limit, etc.). Ground transportation preference rankings **1352** allow the user to assign the level of importance to items within ground transportation preferences **1350** (i.e. rental car, taxi, airport shuttle). Note that unlike the preference rankings for hotels and airlines, ground transportation preference rankings **1352** are mutually exclusive because a user would not want more than one ground transportation selection.

Figure 14 shows travel ranking screen **1400** for assisting the user in ranking travel options. To seed the ranking values found in **Figure 13**, the user opens travel

ranking screen **1400**. Travel ranking screen **1400** includes title bar **1302**, menu bar **1304**, and dialog tabs **1306** also found in calendar profile screen **1300** (see **Figure 13**). Travel ranking screen **1300** is divided between airline ranking inquiry frame **1405**, hotel ranking inquiry frame **1430**, and ground transportation ranking frame **1470**.

Airline ranking inquiry frame **1405** includes questions designed to determine the value of the user's time and the user's threshold for paying for desired air related services. Combo box **1410** is selected by the user to provide the user's willingness in terms of monetary savings in exchange for longer flight times. Combo box **1415** is selected by the user to provide the user's willingness in terms of time to wait in exchange for less expensive flights. The lower the monetary value entered in combo box **1410** in comparison to higher time values entered in combo box **1415**, the more price factors from **Figure 13** are weighted in importance. Conversely, the higher the monetary value entered in combo box **1410** in comparison to lower time values entered in combo box **1415**, the less price factors from **Figure 13** are weighted in importance and the more flight time is weighted in importance. Combo box **1420** provides the user to enter a monetary value for flying a preferred airline. Many users are frequent fliers with certain airlines and receive rewards, in terms of free flights and flight upgrades, for flying more miles with a particular airline. Combo box **1420** allows the user to indicate whether he is willing to pay more for flying a preferred airline rather than a non-preferred airline with the decision often revolving around the user's desire to add to his frequent flier miles. The questions presented

in airline ranking inquiry frame **1405** are examples in obtaining data to set rank values for air travel preferences. Additional questions could be posed to determine the importance to the user of the class of flight, the number of stops (somewhat related to total flying time), and the seat position.

Hotel ranking inquiry frame **1430** includes questions designed to determine the value of the user's convenience and the user's threshold for paying more for preferred hotels. Combo box **1440** is selected by the user to provide the user's willingness in terms of monetary savings in exchange for longer driving distances to his destination. Combo box **1450** is selected by the user to provide the user's willingness in terms of distance to travel in exchange for lower room rates. The lower the monetary value entered in combo box **1440** in comparison to higher distance values entered in combo box **1450**, the more price factors from **Figure 13** are weighted in importance. Conversely, the higher the monetary value entered in combo box **1440** in comparison to lower distance values entered in combo box **1450**, the less price factors from **Figure 13** are weighted in importance and the more convenience factors are weighted in importance. Combo box **1460** allows the user to enter a monetary value for staying at a preferred hotel. Frequent travelers may receive rewards for staying at a particular hotel or simply enjoy a hotel chain more than others due to amenities or services provided at the particular hotel. Combo box **1460** allows the user to indicate whether he is willing to pay more for staying at a preferred hotel rather than at a non-preferred hotel. The questions presented in hotel ranking inquiry frame **1430** are

examples in obtaining data to set rank values for hotel preferences, additional questions could be posed to determine the importance to the user of other factors shown in **Figure 13** when selecting a hotel room.

Ground transportation ranking inquiry frame **1470** includes questions designed to determine the user's preferred method of travel in foreign cities and the value the user places in having his own rental car while traveling. Ground transportation ranking inquiry frame **1470** also determines the strength of the user's rental car company preference when renting a car. Combo box **1480** is selected by the user to determine whether the user prefers being driven by a taxi or shuttle while in a foreign city or prefers driving himself. If the user selects "Agrees" from combo box **1480** then rental car options are ranked lower than taxi and shuttle options. On the other hand, if the user selects "Disagree," then rental car options are ranked higher than taxi and shuttle options. Combo box **1490** provides the user's willingness to pay more for ground transportation in exchange for the convenience of having his own car. Combo box **1495** allows the user to enter a monetary value for using a preferred rental car company. Frequent travelers may receive rewards for using a particular rental car company or may simply prefer a rental car company because of services or features provided by the particular company. Combo box **1495** allows the user to indicate whether he is willing to pay more for using a preferred rental car company. The questions presented in ground transportation ranking inquiry frame **1470** are examples in obtaining data to set rank values for ground transportation preferences, additional questions could be

posed to determine the importance to the user of other ground transportation factors.

Figure 15 is a network diagram of optimizing travel plans using calendar server **1515** and various travel service agents. Calendar data **1520** is transmitted from calendar server **1515** to pervasive computing device **1510** where it can be viewed and modified by user **1500**. User **1500** requests travel information by selecting a destination and travel dates using pervasive computing device **1510**. Pervasive computing device **1510** may be a handheld wireless computing device, a traditional laptop or desktop computer system, or an advanced mobile telephone device that includes a calendaring or travel application. Once user **1500** has selected a travel destination and travel dates, calendar travel inquiry **1525** is sent to calendar server **1515** for storing in the user's calendar data area and for processing the user's travel request. Calendar server **1515** may be an internal calendar server, such as a Lotus Notes™ server, a networked calendar server such as an Internet portal calendar offering (i.e. Yahoo calendar), or an electronic calendar program operated on user **1500**'s computer system (i.e. Microsoft Outlook™ operating on user **1500**'s desktop computer system). Calendar server **1515** and pervasive computing device **1510** may be a common computing device or may be separate computing devices. When pervasive computing device **1510** and calendar server **1515** are separate computing devices, communication between the devices may be facilitated using wireless communication, telephone line-based communication, Internet communication, a combination of wireless, wired, and Internet communication, or any other means of transmitting data between computing devices.

Calendar server **1515** reads user's profile **1505** to determine the user's travel preferences. If the user is planning a business trip, calendar server reads company rules and limits file **1508** which may dictate the spending limits for various travel options and may provide rules requiring the user to take the least expensive travel options available. Calendar server **1515** sends travel request **1540** to computer network **1550** to receive information from various service providers. In one embodiment, computer network **1550** includes the Internet. Flight request component **1555** of travel request **1540** is received by airline server **1560** and corresponding flight data **1565** is returned to calendar server **1515.** Airline server may include several servers for several airlines and may also include air travel databases, such as Expedia™, that provide information regarding multiple airlines. Likewise, hotel request **1570** is received by hotel server **1575** and corresponding hotel information **1580** is returned to calendar server **1515.** Again, hotel server may include multiple servers representing individual hotel companies as well as hotel databases that include hotel information regarding many different hotels. Likewise, ground transportation request **1585** is received by ground transportation servers **1590** and corresponding ground transportation information **1595** is returned to calendar server **1515.** Again, ground transportation server may include multiple servers representing individual rental car companies, taxi services, and shuttle services as well as ground transportation databases that include ground transportation information regarding many different ground transportation options.

Calendar server **1515** gathers returned travel data **1545** and prepares one or more travel package options for the user. Calendar server **1515** also optimizes the available travel options in light of company rules or limits **1508** and user's travel profile **1505**. This travel information **1530** is sent to the user's pervasive computing device **1510** via an email or a link to the user's electronic calendar. As travel data changes, calendar server **1515** may continue to send travel requests **1540** and receive further travel data **1545** with updated pricing and availability for travel components.

When the user is ready to book one or more of the components offered by a service provider and packaged by calendar server **1515**, he sends order **1535** corresponding to the travel service(s) he wishes to book. Order **1551** is sent to travel agent **1552** for purchasing the travel service. While communication is shown flowing between the user, the calendar server, and the travel agent, it is also possible for user **1500** to contact travel agent **1552** using a wired, wireless, or Internet connection. In addition, while a travel agent is shown, the user could purchase the travel service directly from the service provider (i.e. directly from an airline or hotel). Travel agent may be a traditional travel agent with human operators or may be an online Internet-based travel agent (i.e. Expedia™) that allows users to book travel using a credit card. Connections between pervasive computing device **1510** and travel agent **1552** are preferably encrypted to prevent third parties from intercepting personal and/or financial data concerning the user. Travel agent **1552** processes the transactions and prepares receipt **1553** which is transmitted

to pervasive computing device (as receipt **1538**). The receipt will include itinerary related information for the user's reference. The user can continue to order travel components until all travel related services have been purchased. In addition, calendar server continues to provide user **1500** with updated travel options. If better or less expensive options become available, user **1500** can cancel previously booked travel options and obtain the better or less expensive options.

Figure 16 shows a high level flowchart for optimizing travel plans using a calendar server and service agents. Processing commences at **1600** whereupon the user inputs (predefined process **1610**) trip information such as the dates of the trip and the destination (see **Figure 17** for further details). The system uses the destination and date information to search for possible travel options (predefined process **1620**, see **Figure 18** for further details). The system returns one or more options to the user and the user can select preferred options from the returned set of options (predefined process **1630**, see **Figure 19** for further details). Using the user's preferred options, the system optimizes those options (predefined process **1640**, see **Figures 19** and **20** for further details) in order to identify better options in terms of factors the user has deemed important (i.e. price, convenience, travel time, etc.). The user can select from the optimized choices and book all or some of the travel services (predefined process **1650**, see **Figure 19** for further details). As travel options are dynamic in terms of pricing, availability, and other factors, the steps of optimizing the travel options and booking travel options

continues until the destination time arrives (loop **1660**) in order for the user to take advantage of any price reductions that become available or to be notified if a travel service, such as hotel rooms, is becoming constrained at the travel destination. Processing continues until the travel takes place whereupon it terminates at **1690**.

Figure 17 is a flowchart for inputting user trip information and sending the information to the calendar server. Processing commences at **1700** whereupon the user enters trip dates and a destination address (input **1710**). A more accurate destination address (e.g., a street address) will allow the city to identify travel services such as hotels and ground transportation that best suit the user's needs. The user also indicates what type of trip he is taking (input **1720**). If the user is taking a business trip, certain business travel policies and rules may apply. The system reads the user's travel profile (input **1730**) that contains many of the user's travel preferences (see **Figure 13** for one example of a travel profile screen). If the user is taking a business trip, decision **1740** branches to "yes" branch **1745**, otherwise "no" branch **1780** is taken. "Yes" branch **1745** processing includes reading any business rules and travel policies that may be set by the business (input **1750**). For example, a business may have hotel limits for various cities and the user needs to find a hotel room that is not greater than the limit. Another example may be that the company wants the user to use the airline with the lowest flight cost regardless of whether the user prefers that airline. If the user specified that he wishes to do some sightseeing while traveling, decision

1760 branches to "yes" branch **1765.** The user indicated whether he was planning on sightseeing in input **1720** when specifying the type of trip being taken. If the user does plan on doing some sightseeing while on his business trip, interest are read (input **1770**) to further assist the user in making travel plans. Interests can be entered by the user or included in a travel profile. For example, if the user enjoys theatre or live music, the system can take this information into account and suggest events taking place in the destination city. If the user is interested in the suggested events, then tickets for the events can be purchased along with the other travel related services being purchased. The user can also indicate whether he should be billed separately in order to keep personal side trip expenses from appearing on business expense receipts.

If the user is not taking a business trip, "no" branch **1780** is taken whereupon personal interest information is read (input **1785**) in order to suggest possible events that the user may wish to attend. Personal interest recommendations are done in a substantially similar manner as the personal interests read in input **1770** and described above.

After the user's interests have been read and any business rules or policies have been read, the travel request is packaged and sent to a server for identifying possible travel options for the user (output **1790**). Processing for this section concludes at return **1795.**

Figure 18 is a flowchart for searching service agent servers for possible travel packages. System processing commences at **1800** whereupon the user's request for travel

packages is received (input **1810**). The request received was sent to the server during output **1790** (see **Figure 17**). The server contacts other servers that store data regarding travel operations. Travel server list **1830** is either maintained at the server or may be stored on a network server (i.e. on the Internet) and shared amongst multiple servers. Server may utilize general purpose travel server lists in addition to local travel server lists that have been identified by the company or individual user. Travel server lists are read (input **1820**) providing addresses (e.g., URLs) of travel servers. One or more travel servers **1850** are contacted to gather travel information. The server contacts those travel servers that have information that is of potential interest to the user. Travel servers include both specific and general servers. For example, if the user is flying, both general and airline specific travel servers will be contacted. On the other hand, if the user is driving to the destination such airline servers would not be contacted. For example, a particular airline server may be queried to obtain the latest information on that airline. In addition, or alternatively, industry servers may provide the same information, for example the Sabre™ airline reservation system used by travel agents and containing information about virtually all domestic airline flights. The same specific and general servers apply to hotel information and ground transportation information. Other travel servers, such as servers relating to a particular destination, may also be queried to gather information concerning events taking place in or near the destination. Responses to the server's queries are received by the server (input **1860**). The received responses are filtered (step **1870**) to eliminate unusable

options (such as options that fail any business rules or policies). The remaining options are also sorted (step **1880**) to order the returned options along the ranking parameters established by the user (see **1305, 1310, 1332,** and **1352** from **Figure 13**). Processing for this section then concludes at return **1890.**

Figure 19 is a flowchart for optimizing and booking components within a desired travel package. System processing **1905** commences with the filtered and sorted travel packages (filtered in step **1870** and optimized in step **1880** in **Figure 18**) being returned to the user (output **1910**). User processing **1900** consequently commences with receiving the filtered and sorted travel packages (input **1915**). The user analyzes the available packages and chooses a package in which he is most interested (step **1920**). This package request is sent (output **1925**) to the server for further processing and optimization. The server, in turn, receives the user's package request (input **1930**) and optimizes the package (step **1935**) using user profile **1940** and company rules and policies **1945** (if the trip is a business trip). Optimization (step **1935**) takes place using the importance factors set forth by the business and the user. If price is most important, for example, the system attempts to find the lowest price for the user's desired package. On the other hand, if a particular airline is most important the airline may be selected even if its price is slightly higher than another airline. Optimization may further include requesting more detail or discounts from travel service providers (see **1840, 1850,** and **1860** from **Figure 18**). Optimization further includes providing suggestions to the user based on the

current travel environment. For example, if hotels in the destination city are scarce due to a convention, the user is informed that he may wish to act quickly in booking a hotel room. Also, if airline rates are only valid for a certain amount of time, the user is informed of this so that he can purchase his tickets before the cost increases. Once the user's selected package is optimized and any travel suggestions are noted by the server, the information is returned to the user (output **1950**). The user, in turn, receives the optimized package information (input **1955**). If he wishes to book one or more of the travel components (decision **1960**), "yes" branch **1961** is taken whereupon a message is transmitted to a travel agent or travel service provider (output **1962**). Output **1962** may be encrypted using public key / private key encryption or using digital certificates as it may contain confidential information, such as credit card numbers, that the user does not want third parties to intercept. If the user does not wish to book any component, "no" branch **1964** it taken. If more components are left to be booked, decision **1965** branches to "yes" branch **1970** looping back to receive further optimized travel package components. The server continues to send further optimized travel components in order for the user to take advantage of any specials and to be informed of changes in the travel environment such as a shortage of hotel rooms or seats on airlines. When no more components need to be booked (or when the travel dates of the trip have passed), "no" branch **1975** is taken and user processing ends at **1980.** At the server, after the server sends optimized travel components (output **1950**) it checks (decision **1985**) whether there is time left (i.e. whether the user's trip has already occurred). If there is time

remaining, "yes" branch **1985** is taken looping back to check for any changes to the travel components by re-optimizing the travel components (step **1935**) and sending the optimized results to the user (output **1950**). If there is not time left, "no" branch **1990** is taken and processing terminates at **1995**.

Figure 20 shows a flowchart for optimizing components within travel packages. Processing commences at **2000** whereupon air travel components for a received air travel option are processed (step **2005**). Air travel factors are weighted (step **2010**) by their corresponding rank values (see rank values **1310** in **Figure 13**). An overall score for the flight is determined by combining the scores for the various components (step **2015**). In this manner, flights matching user preferences, such as low cost, receive generally higher scores. Decision **2020** determines whether more flights for the package need to be analyzed. If more flights need to be analyzed, "yes" branch **2022** is taken looping back to step **2010**. If no more flights need to be analyzed, "no" branch **2023** is taken whereupon hotel components for a received hotel option are processed (step **2025**).

Hotel travel factors are weighted (step **2030**) by their corresponding rank values (see rank values **1332** in **Figure 13**). An overall score for the hotel is determined by combining the scores for the various components (step **2035**). In this manner, hotels matching user preferences, such as low cost, receive generally higher scores. Decision **2040** determines whether more hotels for the package need to be analyzed. If more hotels need to be

analyzed, "yes" branch **2042** is taken looping back to step **2030**. If no more hotels need to be analyzed, "no" branch **2043** is taken whereupon ground transportation components for a received ground transportation option are processed (step **2045**).

Ground transportation factors are weighted (step **2050**) by their corresponding rank values (see rank values **1352** in **Figure 13**). An overall score for the ground transportation option is determined by combining the scores for the various components (step **2055**). In this manner, ground transportation options matching user preferences, such as low cost, receive generally higher scores. Decision **2060** determines whether more ground transportation options for the package need to be analyzed. If more ground transportation options need to be analyzed, "yes" branch **2062** is taken looping back to step **2050**.

If no more ground transportation options need to be analyzed, "no" branch **2063** is taken whereupon the air, hotel, and ground transportation scores are weighted (step **2065**) by the user's rankings (see rank values **1305** in **Figure 13**). In this way, if the user considers the air travel component of the package more important than the hotel or ground transportation factors, the air transportation will be more heavily weighted than the other package components. Likewise, if the user is going on a vacation, he may decide to weight the hotel portion of the package more heavily than the other package components. An overall score is computed (step **2070**) for the package by combining the air, hotel, and ground transportation scores. Finally, some packages (e.g., for travel to a convention)

may include combination discounts, such as reduced airfare on a particular airline and free shuttle service when the user stays at a particular hotel. These combination services are applied to the package (step **2075**) and the package score is adjusted accordingly. If there are more packages to analyze, decision **2080** branches to "yes" branch **2085** looping back to the beginning of the processing (step **2005**) in order to analyze the air, hotel, and ground transportation components of the next package. If, on the other hand, no more packages need to be analyzed, "no" branch **2090** is taken whereupon the collected packages are sorted based on their overall scores and processing returns (step **2095**) to the calling routine (see predefined process **1880** from **Figure 18** and predefined process **1935** from **Figure 19**).

Figure 21 illustrates information handling system **2101** which is a simplified example of a computer system capable of performing the present invention. Computer system **2101** includes processor **2100** which is coupled to host bus **2105**. A level two (L2) cache memory **2110** is also coupled to the host bus **2105**. Host-to-PCI bridge **2115** is coupled to main memory **2120**, includes cache memory and main memory control functions, and provides bus control to handle transfers among PCI bus **2125**, processor **2100**, L2 cache **2110**, main memory **2120**, and host bus **2105**. PCI bus **2125** provides an interface for a variety of devices including, for example, LAN card **2130**. PCI-to-ISA bridge **2135** provides bus control to handle transfers between PCI bus **2125** and ISA bus **2140**, universal serial bus (USB) functionality **2145**, IDE device functionality **2150**, power management functionality **2155**, and can include other functional elements not shown, such

as a real-time clock (RTC), DMA control, interrupt support, and system management bus support. Peripheral devices and input/output (I/O) devices can be attached to various interfaces **2160** (e.g., parallel interface **2162**, serial interface **2164**, infrared (IR) interface **2166**, keyboard interface **2168**, mouse interface **2170**, and fixed disk (HDD) **2172**) coupled to ISA bus **2140**. Alternatively, many I/O devices can be accommodated by a super I/O controller (not shown) attached to ISA bus **2140**.

BIOS **2180** is coupled to ISA bus **2140**, and incorporates the necessary processor executable code for a variety of low-level system functions and system boot functions. BIOS **2180** can be stored in any computer readable medium, including magnetic storage media, optical storage media, flash memory, random access memory, read only memory, and communications media conveying signals encoding the instructions (e.g., signals from a network). In order to attach computer system **2101** another computer system to copy files over a network, LAN card **2130** is coupled to PCI-to-ISA bridge **2135**. Similarly, to connect computer system **2101** to an ISP to connect to the Internet using a telephone line connection, modem **2175** is connected to serial port **2164** and PCI-to-ISA Bridge **2135**.

While the computer system described in **Figure 21** is capable of executing the invention described herein, this computer system is simply one example of a computer system. Those skilled in the art will appreciate that many other computer system designs are capable of performing the copying process described herein.

One of the preferred implementations of the invention is an application, namely, a set of instructions (program code) in a code module which may, for example, be resident in the random access memory of the computer. Until required by the computer, the set of instructions may be stored in another computer memory, for example, on a hard disk drive, or in removable storage such as an optical disk (for eventual use in a CD ROM) or floppy disk (for eventual use in a floppy disk drive), or downloaded via the Internet or other computer network. Thus, the present invention may be implemented as a computer program product for use in a computer. In addition, although the various methods described are conveniently implemented in a general purpose computer selectively activated or reconfigured by software, one of ordinary skill in the art would also recognize that such methods may be carried out in hardware, in firmware, or in more specialized apparatus constructed to perform the required method steps.

While particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that, based upon the teachings herein, changes and modifications may be made without departing from this invention and its broader aspects and, therefore, the appended claims are to encompass within their scope all such changes and modifications as are within the true spirit and scope of this invention. Furthermore, it is to be understood that the invention is solely defined by the appended claims. It will be understood by those with skill in the art that if a specific number of an introduced claim element is intended, such intent will be explicitly recited in the claim, and in the absence of such recitation no such

limitation is present. For non-limiting example, as an aid to understanding, the following appended claims contain usage of the introductory phrases "at least one" and "one or more" to introduce claim elements. However, the use of such phrases should not be construed to imply that the introduction of a claim element by the indefinite articles "a" or "an" limits any particular claim containing such introduced claim element to inventions containing only one such element, even when the same claim includes the introductory phrases "one or more" or "at least one" and indefinite articles such as "a" or "an"; the same holds true for the use in the claims of definite articles.

WHAT IS CLAIMED IS:

1. A method of handling travel arrangements, said method comprising:
scheduling the travel arrangements using a computer system;
recording the scheduled travel arrangements on a nonvolatile storage device connected to the computer system; and
sending one or more automated requests from the computer system to one or more service agents.

2. The method as described in claim 1 wherein the service agents include one or more delivery service agents.

3. The method as described in claim 2 further comprising:
sending includes one of sending an automatic email message, sending an automatic facsimile, and sending an automatic data stream using a predefined protocol.

4. The method as described in claim 2 wherein the delivery service agents include one or more parcel services, and
wherein the automated requests include one of holding packages for customer pickup, delivering packages on a future date, and leaving packages with a neighbor.

5. The method as described in claim 2 wherein the delivery services include a post office, and

wherein the automated requests include at least one of holding mail for customer pickup, delivering mail on a future date, and forwarding mail to another address.

6. The method as described in claim 2 wherein the delivery services includes a company mailroom, and wherein the automated requests include at least one of holding mail for future pickup, delivering mail on a future date, and forwarding mail to another address.

7. The method as described in claim 1 wherein the service agents include one or more telephone systems and wherein the sending automated requests include configuring instructions corresponding to a telephone.

8. The method as described in claim 7 wherein the configuring requests include at least one of changing a voicemail greeting, forwarding calls received at a first phone number to a second phone number, transferring a caller to an alternate phone number, and providing the caller with an emergency contact.

9. The method as described in claim 7 further comprising:
registering the telephone with an email system prior to the configuring,
wherein the registering includes sending a message to the email system.

10. The method as described in claim 7 wherein the transferring further includes:

setting a backup contact name, wherein the backup contact name corresponds with the alternate phone number; and

receiving a predefined signal from a calling telephone requesting the transferring to the alternate phone number.

11. The method as described in claim 1 wherein the service agents include an electronic calendar system.

12. The method as described in claim 11 further comprising:

receiving the automated request at the electronic calendar system; and

updating an electronic calendar maintained by the electronic calendar system with information related to the travel arrangements.

13. The method as described in claim 1 wherein the service agents include a medical information system.

14. The method as described in claim 13 further comprising:

receiving the automated request at the medical information system; and

downloading destination related medical information to a computing device that is accessible by a user in response to the received request.

15. The method as described in claim 14 wherein the medical information corresponds with one or more medical services offered at a travel destination.

16. The method as described in claim 1 wherein the service agents include a travel information system.

17. The method as described in claim 16 further comprising:
receiving the automated request at the travel information system; and
downloading travel information that includes at least one of driving instructions, GPS data, area attraction information, civic event information, and cultural event information.

18. An information handling system comprising:
one or more processors;
a memory accessible by the processors;
a nonvolatile storage device accessible by the processors; and
a travel automation tool, the travel automation tool including:
means for scheduling travel arrangements using a computer system;
means for recording the scheduled travel arrangements on the nonvolatile storage device; and
means for sending one or more automated requests from the information handling system to one or more service agents.

19. The information handling system as described in claim 18 wherein the service agents include one or more delivery service agents.

20. The information handling system as described in claim 19 wherein the means for sending includes at least one of sending an automatic email message, sending an automatic facsimile, and sending an automatic data stream using a predefined protocol.

21. The information handling system as described in claim 19 wherein the automated requests include at least one of holding packages for future pickup, delivering packages on a future date, and leaving packages at an alternate location.

22. The information handling system as described in claim 18 wherein the service agents include one or more telephone systems and wherein the means for sending automated requests include means for configuring a telephone based on the automated requests.

23. The information handling system as described in claim 22 further comprising:
means for registering the telephone with an email system prior to the configuring,
wherein the registering includes means for sending a message to the email system.

24. The information handling system as described in claim 18 wherein the service agents include an electronic calendar system.

25. The information handling system as described in claim 24 further comprising:
means for receiving the automated request at the electronic calendar system; and

means for updating an electronic calendar maintained by the electronic calendar system with information related to the travel arrangements.

26. The information handling system as described in claim 18 wherein the service agents include a second information handling system.

27. The information handling system as described in claim 26 further comprising:
means for receiving the automated request at the second information handling system;
means for searching a database connected to the second information handling system for requested information;
means for downloading information resulting from the searching to a computing device that is accessible by a user.

28. A computer program product for handling travel arrangements, said computer program product comprising:
means for scheduling the travel arrangements using a computer system;
means for recording the scheduled travel arrangements on a nonvolatile storage device connected to the computer system; and
means for sending one or more automated requests from the computer system to one or more service agents.

29. The computer program product as described in claim 28 wherein the service agents include one or more delivery service agents.

30. The computer program product as described in claim 29 wherein the means for sending includes at least one of sending an automatic email message, sending an automatic facsimile, and sending an automatic data stream using a predefined protocol.

31. The computer program product as described in claim 29 wherein the automated requests include at least one of holding packages for customer pickup, delivering packages on a future date, and leaving packages at an alternate location.

32. The computer program product as described in claim 28 wherein the service agents include one or more telephone systems and wherein the means for sending automated requests include means for configuring a telephone based on the automated requests.

33. The computer program product as described in claim 32 further comprising:
means for registering the telephone with an email system prior to the configuring,
wherein the registering includes means for sending a message to the email system.

34. The computer program product as described in claim 28 wherein the service agents include an electronic calendar system.

35. The computer program product as described in claim 34 further comprising:
means for receiving the automated request at the electronic calendar system; and
means for updating an electronic calendar maintained by the electronic calendar system with information related to the travel arrangements.

36. The computer program product as described in claim 28 wherein the service agents include a second computer program product.

37. The computer program product as described in claim 36 further comprising:
means for receiving the automated request at the second computer program product;
means for searching a database connected to the second computer program product for requested information;
means for downloading information resulting from the searching to a computing device that is accessible by a user.

System and Method for Automating Travel Agent Operations

ABSTRACT

A system and method for automatically performing actions in response to a user making travel arrangements. Delivery services, such as postal and parcel services, are instructed to take certain actions while the user is traveling. For example, the delivery can be instructed to hold packages for pickup by the user, deliver the packages to the user when the user returns, or forward the packages to another location. In addition, a system and method for notifying a company mailroom with travel instructions is included. An electronic calendar is automatically updated with information related to the user's travel plans. Other users with access to the calendar can view the user's travel agenda. The user can gather travel specific details from the calendar for use in traveling, for example the flight and hotel information, is readily available. The user's telephone can also be configured as preferred by the user. Calls can be forwarded to the user's travel location, voice mail greetings can be updated to reflect the user's out-of-office status, and backup and emergency information can be updated. Destination information such as driving information, GPS data for use by GPS devices, medical services information, and civic, cultural, or attraction information can be downloaded to the user for use while at the destination.

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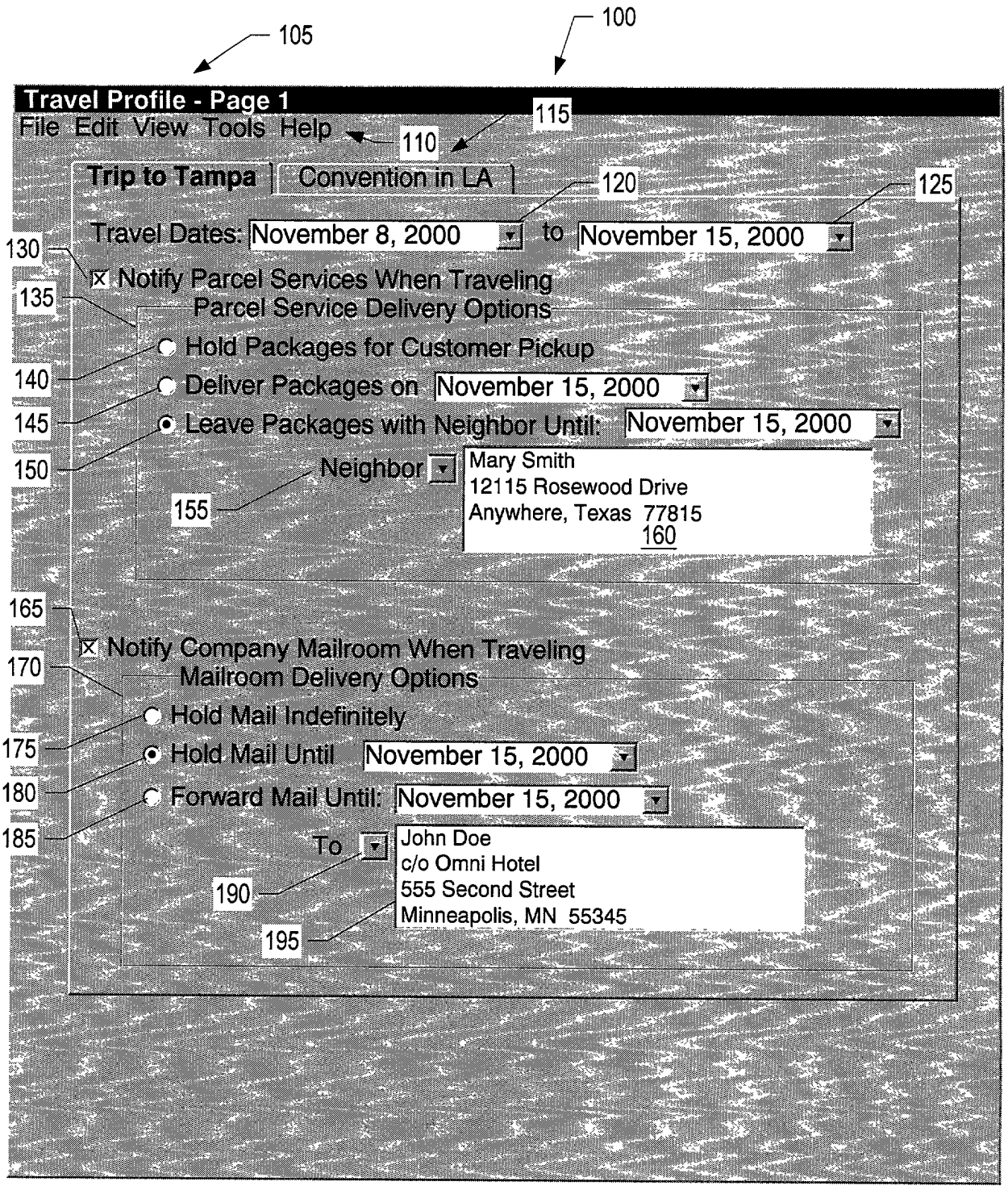


Figure 1

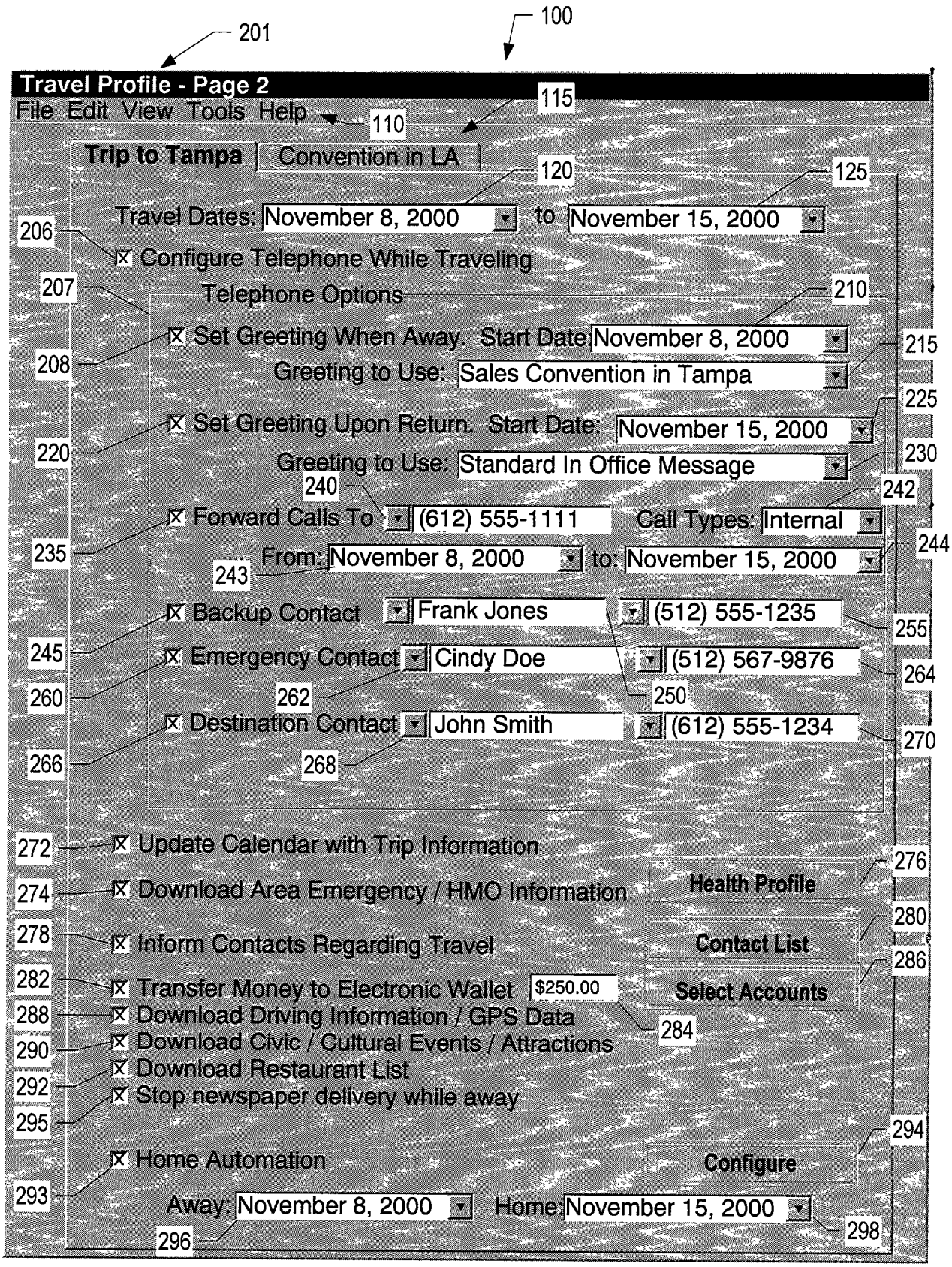

201
100
Travel Profile - Page 2
File Edit View Tools Help
110
115
Trip to Tampa
Convention in LA
120
125
Travel Dates: November 8, 2000
to
November 15, 2000
206
Configure Telephone While Traveling
207
Telephone Options
210
Set Greeting When Away. Start Date
November 8, 2000
208
215
Greeting to Use:
Sales Convention in Tampa
225
Set Greeting Upon Return. Start Date:
November 15, 2000
220
230
Greeting to Use:
Standard In Office Message
240
242
Forward Calls To
(612) 555-1111
Call Types:
Internal
235
244
From:
November 8, 2000
to:
November 15, 2000
243
Backup Contact
Frank Jones
(512) 555-1235
255
245
Emergency Contact
Cindy Doe
(512) 567-9876
264
260
262
250
Destination Contact
John Smith
(612) 555-1234
270
266
268
272
Update Calendar with Trip Information
276
274
Download Area Emergency / HMO Information
Health Profile
280
278
Inform Contacts Regarding Travel
Contact List
286
282
Transfer Money to Electronic Wallet
$250.00
Select Accounts
288
Download Driving Information / GPS Data
284
290
Download Civic / Cultural Events / Attractions
Download Restaurant List
292
Stop newspaper delivery while away
295
294
Home Automation
Configure
293
Away:
November 8, 2000
Home:
November 15, 2000
296
298

Figure 2

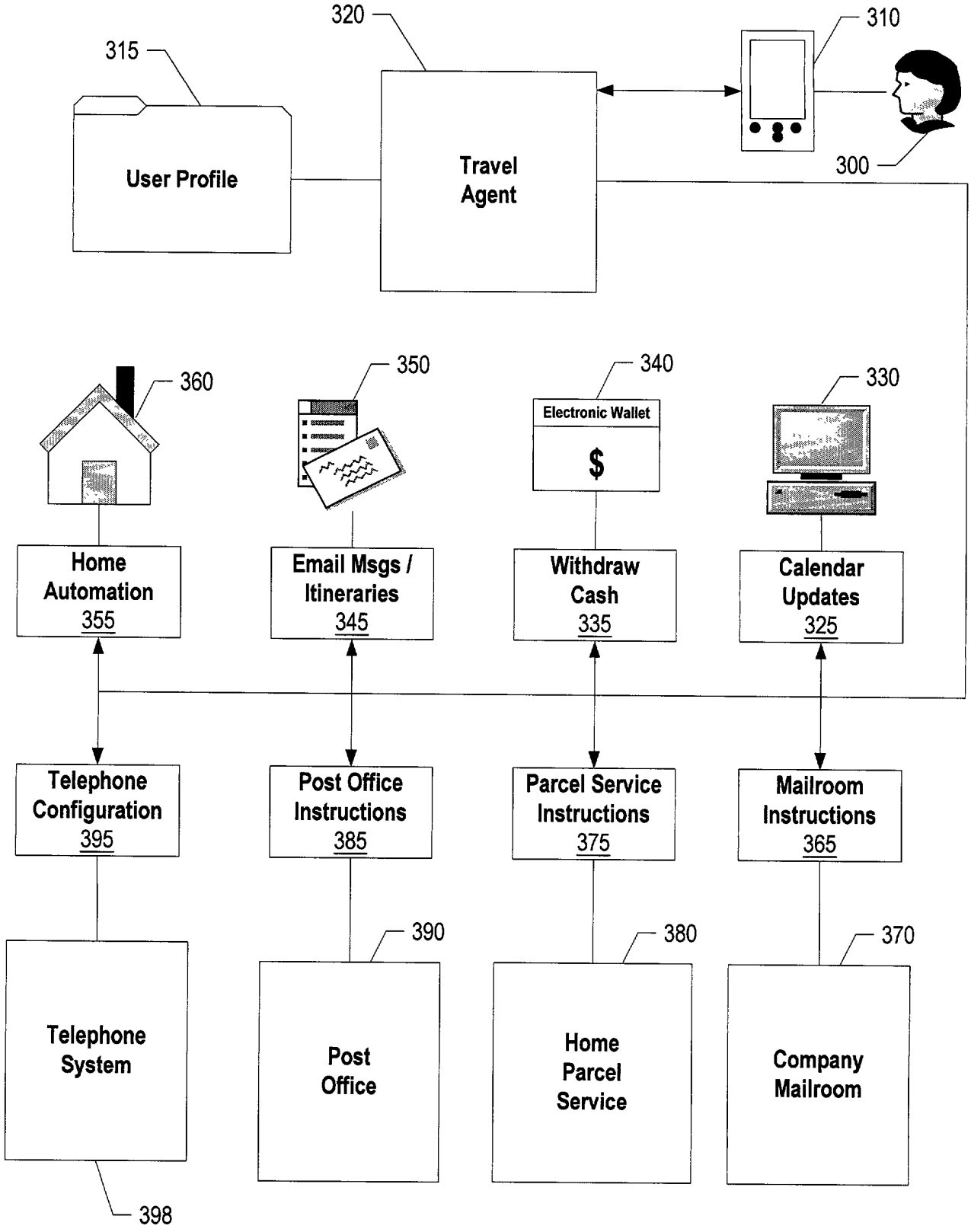

320
315
310
User Profile
Travel Agent
300
360
350
340
330
Electronic Wallet
$
Home Automation 355
Email Msgs / Itineraries 345
Withdraw Cash 335
Calendar Updates 325
Telephone Configuration 395
Post Office Instructions 385
Parcel Service Instructions 375
Mailroom Instructions 365
390
380
370
Telephone System
Post Office
Home Parcel Service
Company Mailroom
398

Figure 3

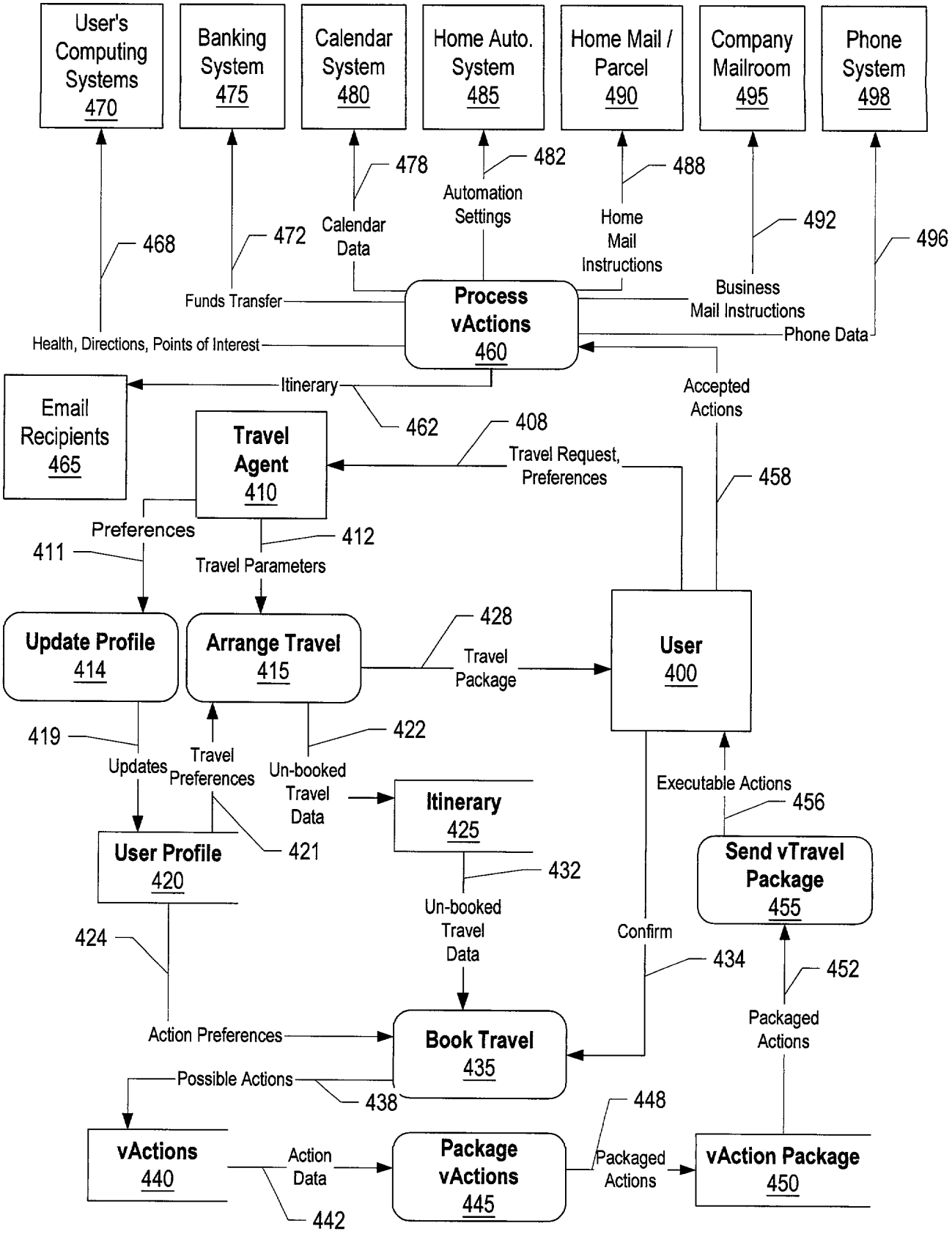

User's Computing Systems 470
Banking System 475
Calendar System 480
Home Auto. System 485
Home Mail / Parcel 490
Company Mailroom 495
Phone System 498
468
472
478
Calendar Data
482
Automation Settings
488
Home Mail Instructions
492
496
Funds Transfer
Process vActions 460
Business Mail Instructions
Phone Data
Health, Directions, Points of Interest
Email Recipients 465
Itinerary
462
408
Travel Agent 410
Travel Request, Preferences
Accepted Actions
458
Preferences
411
412
Travel Parameters
Update Profile 414
Arrange Travel 415
428
Travel Package
User 400
419
422
Updates
Travel Preferences
Un-booked Travel Data
Itinerary 425
Executable Actions
456
User Profile 420
421
Send vTravel Package 455
432
Un-booked Travel Data
424
Confirm
434
452
Packaged Actions
Action Preferences
Book Travel 435
Possible Actions
438
448
vActions 440
Action Data
Package vActions 445
Packaged Actions
vAction Package 450
442

Figure 4

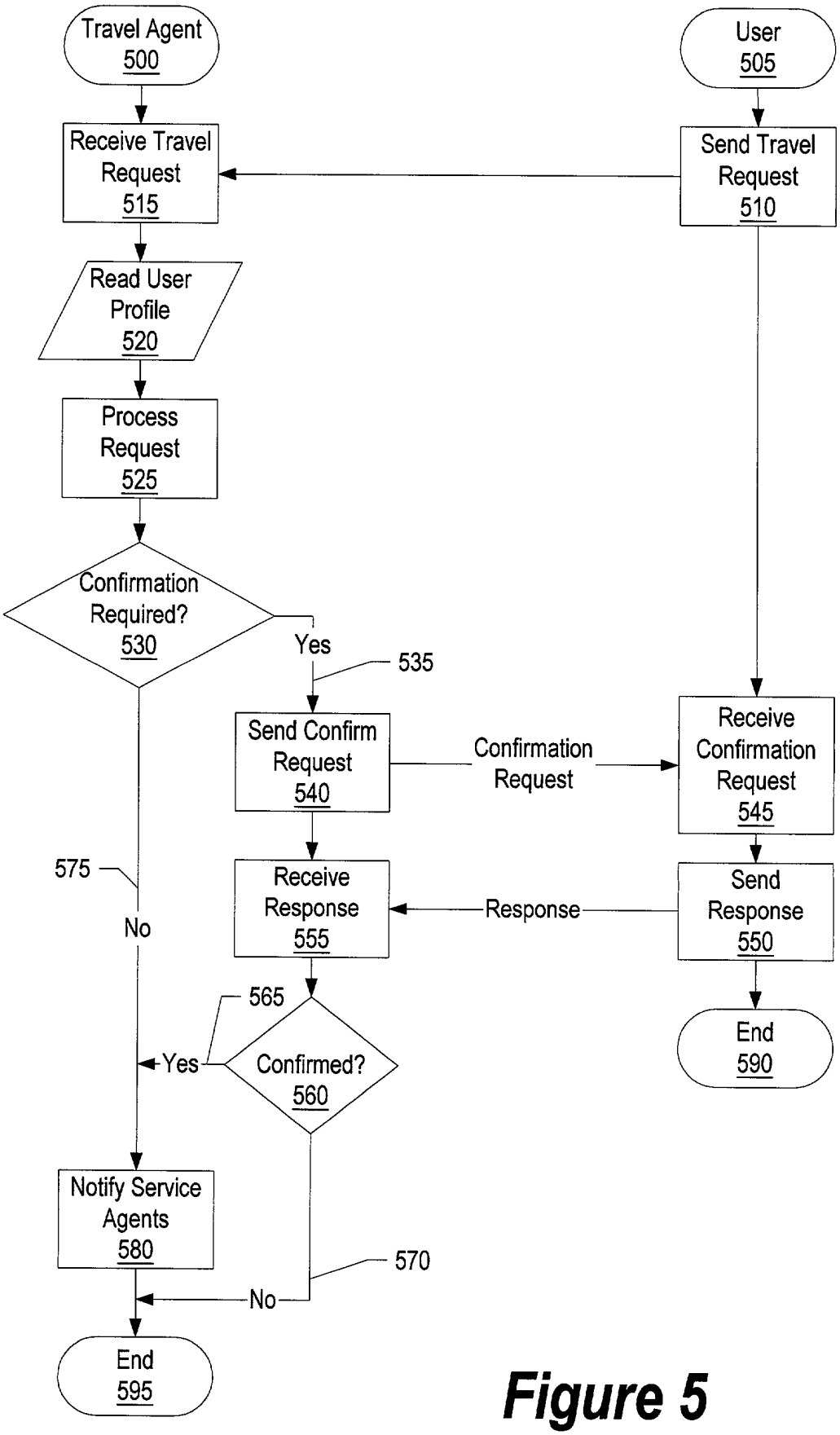

Travel Agent
500
User
505
Receive Travel Request
515
Send Travel Request
510
Read User Profile
520
Process Request
525
Confirmation Required?
530
Yes
535
Send Confirm Request
540
Confirmation Request
Receive Confirmation Request
545
575
No
Receive Response
555
Response
Send Response
550
565
Yes
Confirmed?
560
End
590
Notify Service Agents
580
570
No
End
595

Figure 5

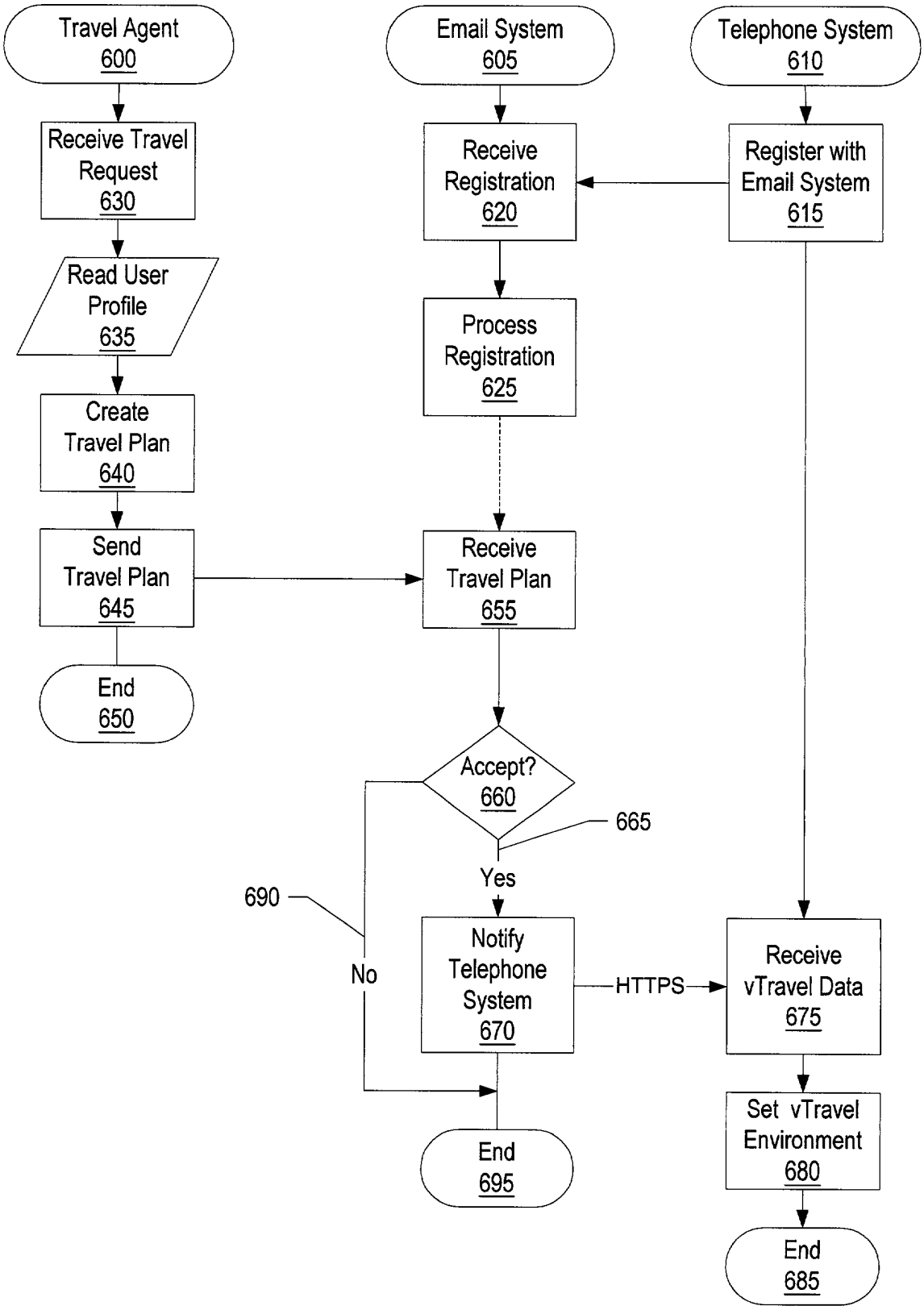

Travel Agent
600
Email System
605
Telephone System
610
Receive Travel Request
630
Receive Registration
620
Register with Email System
615
Read User Profile
635
Process Registration
625
Create Travel Plan
640
Send Travel Plan
645
Receive Travel Plan
655
End
650
Accept?
660
665
Yes
690
No
Notify Telephone System
670
HTTPS
Receive vTravel Data
675
Set vTravel Environment
680
End
695
End
685

Figure 6

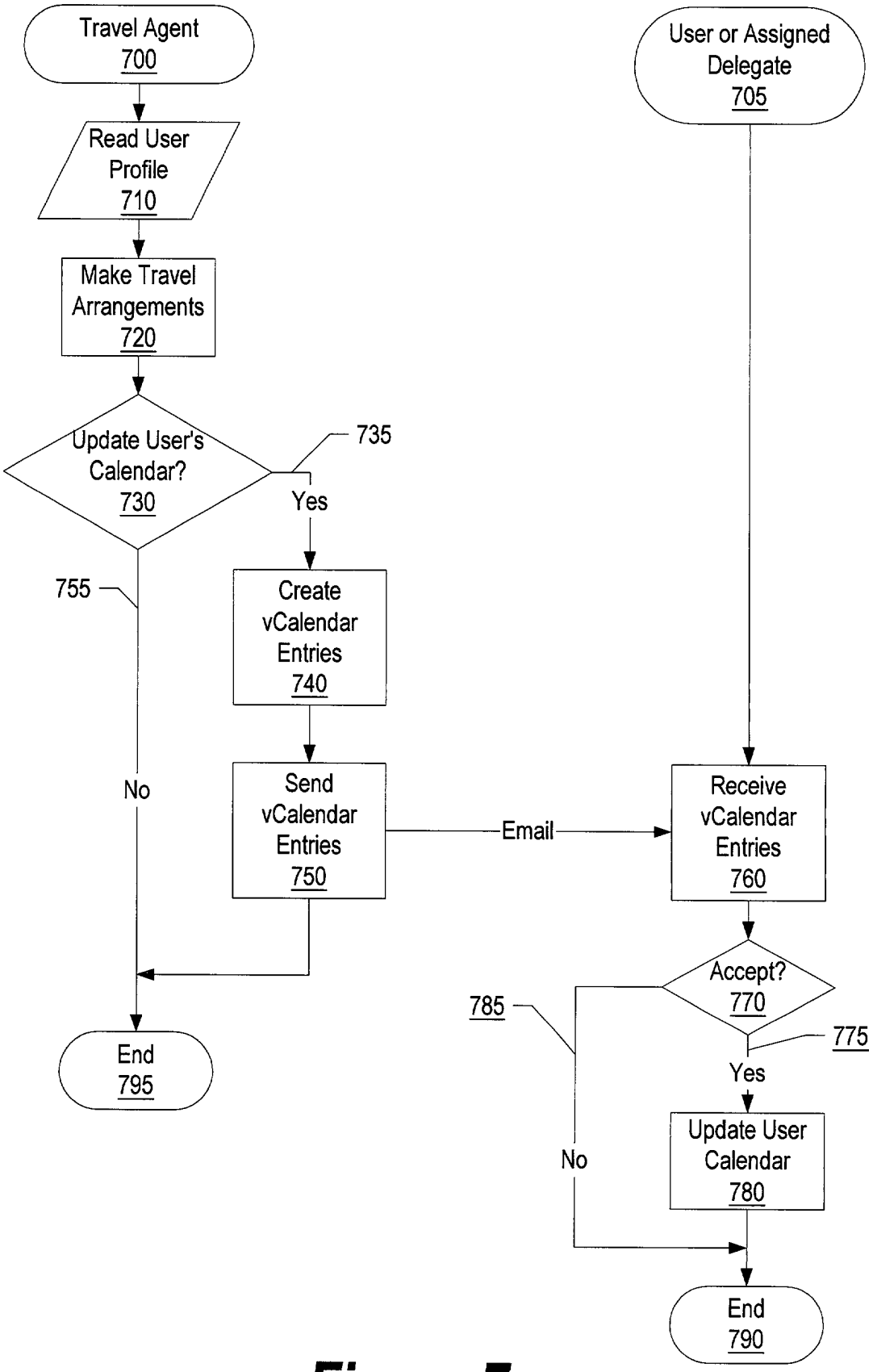

Travel Agent
700
Read User Profile
710
Make Travel Arrangements
720
Update User's Calendar?
730
735
Yes
755
No
Create vCalendar Entries
740
Send vCalendar Entries
750
End
795
User or Assigned Delegate
705
Email
Receive vCalendar Entries
760
Accept?
770
785
775
Yes
No
Update User Calendar
780
End
790

Figure 7

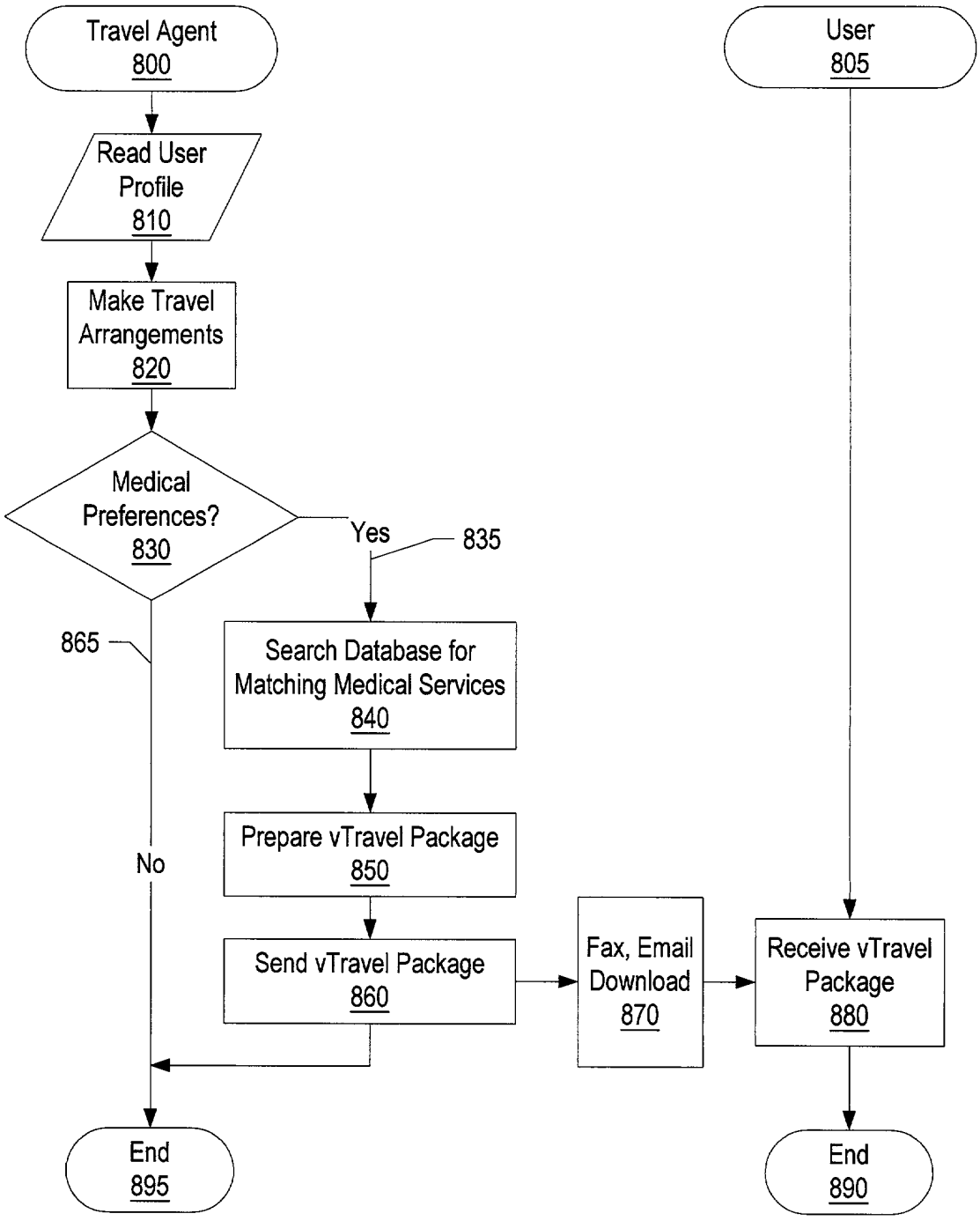

Travel Agent
800
User
805
Read User Profile
810
Make Travel Arrangements
820
Medical Preferences?
830
Yes
835
865
No
Search Database for Matching Medical Services
840
Prepare vTravel Package
850
Send vTravel Package
860
Fax, Email Download
870
Receive vTravel Package
880
End
895
End
890

Figure 8

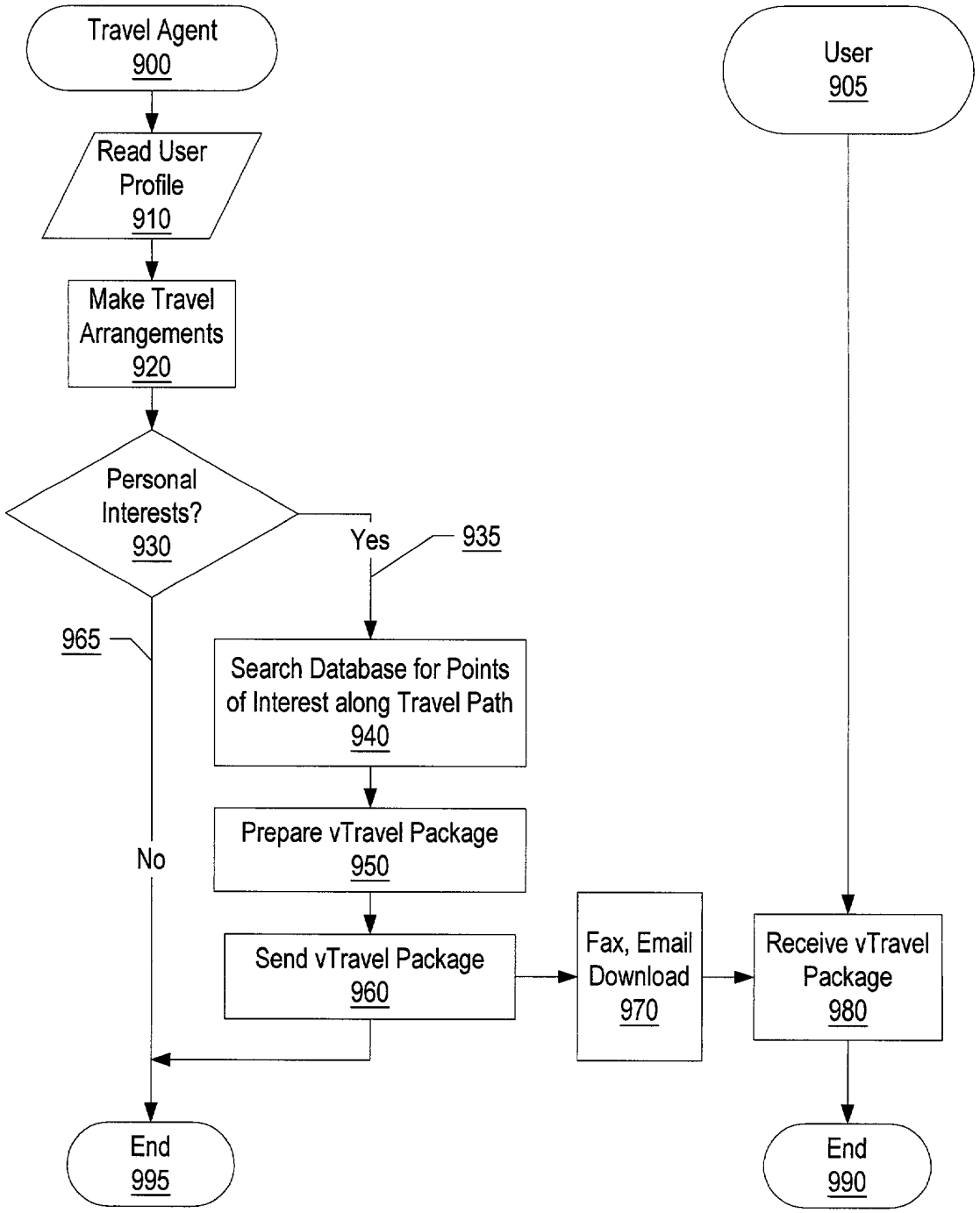

Travel Agent
900
User
905
Read User Profile
910
Make Travel Arrangements
920
Personal Interests?
930
Yes
935
965
Search Database for Points of Interest along Travel Path
940
Prepare vTravel Package
950
No
Send vTravel Package
960
Fax, Email Download
970
Receive vTravel Package
980
End
995
End
990

Figure 9

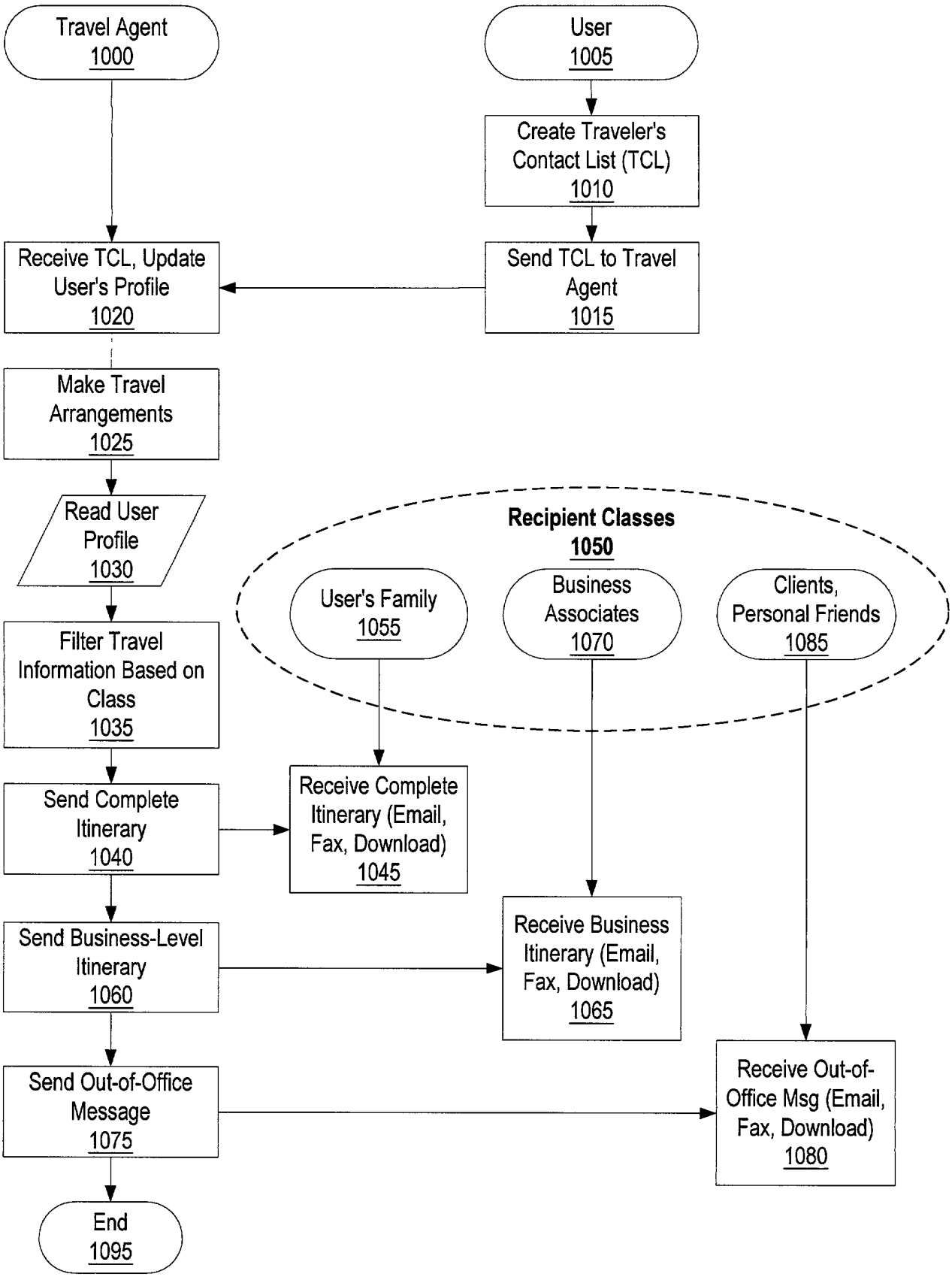

Travel Agent
1000
User
1005
Create Traveler's Contact List (TCL)
1010
Send TCL to Travel Agent
1015
Receive TCL, Update User's Profile
1020
Make Travel Arrangements
1025
Read User Profile
1030
Filter Travel Information Based on Class
1035
Recipient Classes
1050
User's Family
1055
Business Associates
1070
Clients, Personal Friends
1085
Send Complete Itinerary
1040
Receive Complete Itinerary (Email, Fax, Download)
1045
Send Business-Level Itinerary
1060
Receive Business Itinerary (Email, Fax, Download)
1065
Send Out-of-Office Message
1075
Receive Out-of-Office Msg (Email, Fax, Download)
1080
End
1095

Figure 10

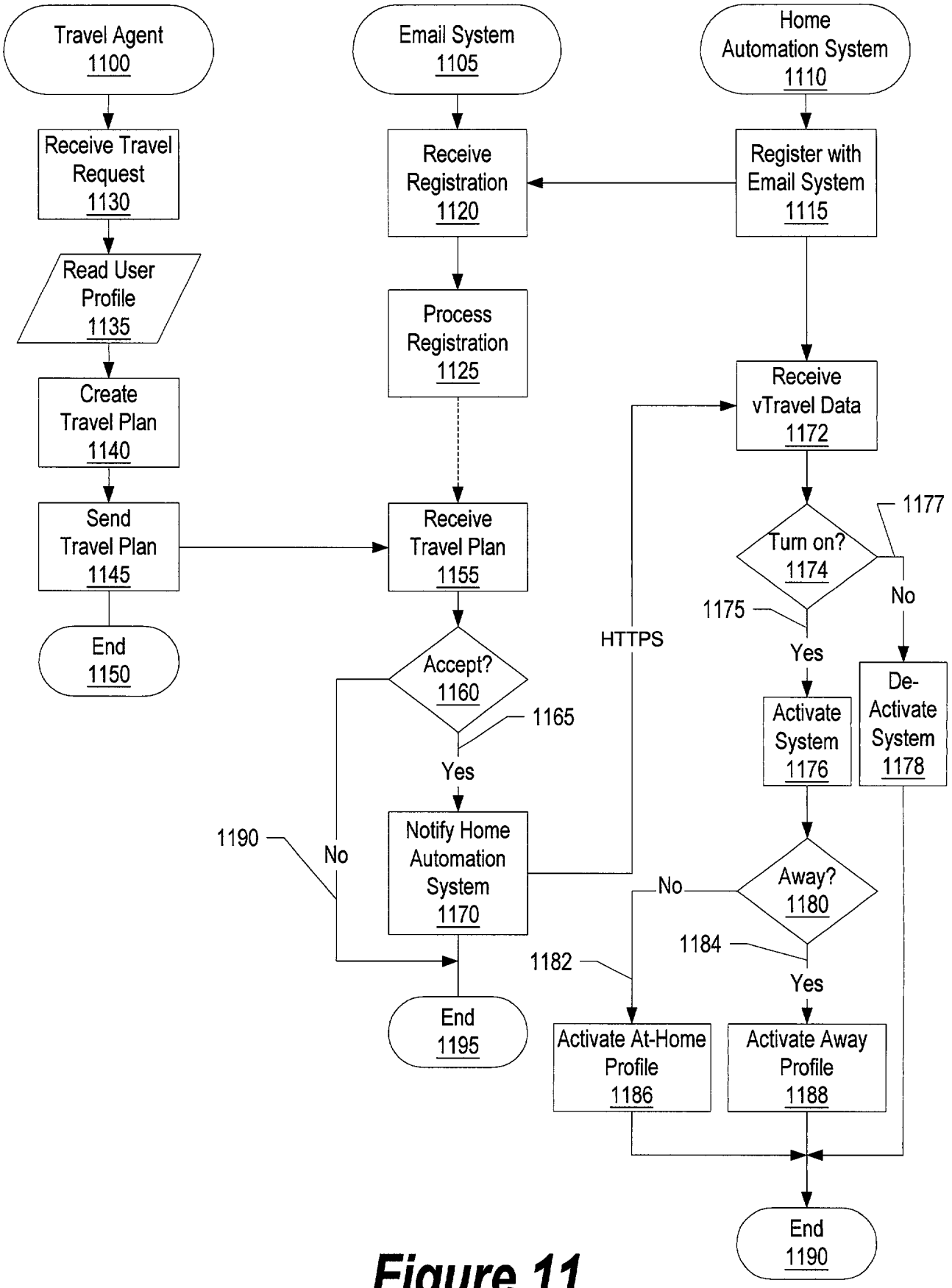

Travel Agent
1100
Email System
1105
Home Automation System
1110
Receive Travel Request
1130
Receive Registration
1120
Register with Email System
1115
Read User Profile
1135
Process Registration
1125
Create Travel Plan
1140
Receive vTravel Data
1172
Send Travel Plan
1145
Receive Travel Plan
1155
1177
Turn on?
1174
No
1175
HTTPS
Yes
End
1150
Accept?
1160
De-Activate System
1178
1165
Activate System
1176
Yes
1190
No
Notify Home Automation System
1170
Away?
1180
No
1184
1182
Yes
End
1195
Activate At-Home Profile
1186
Activate Away Profile
1188
End
1190

Figure 11

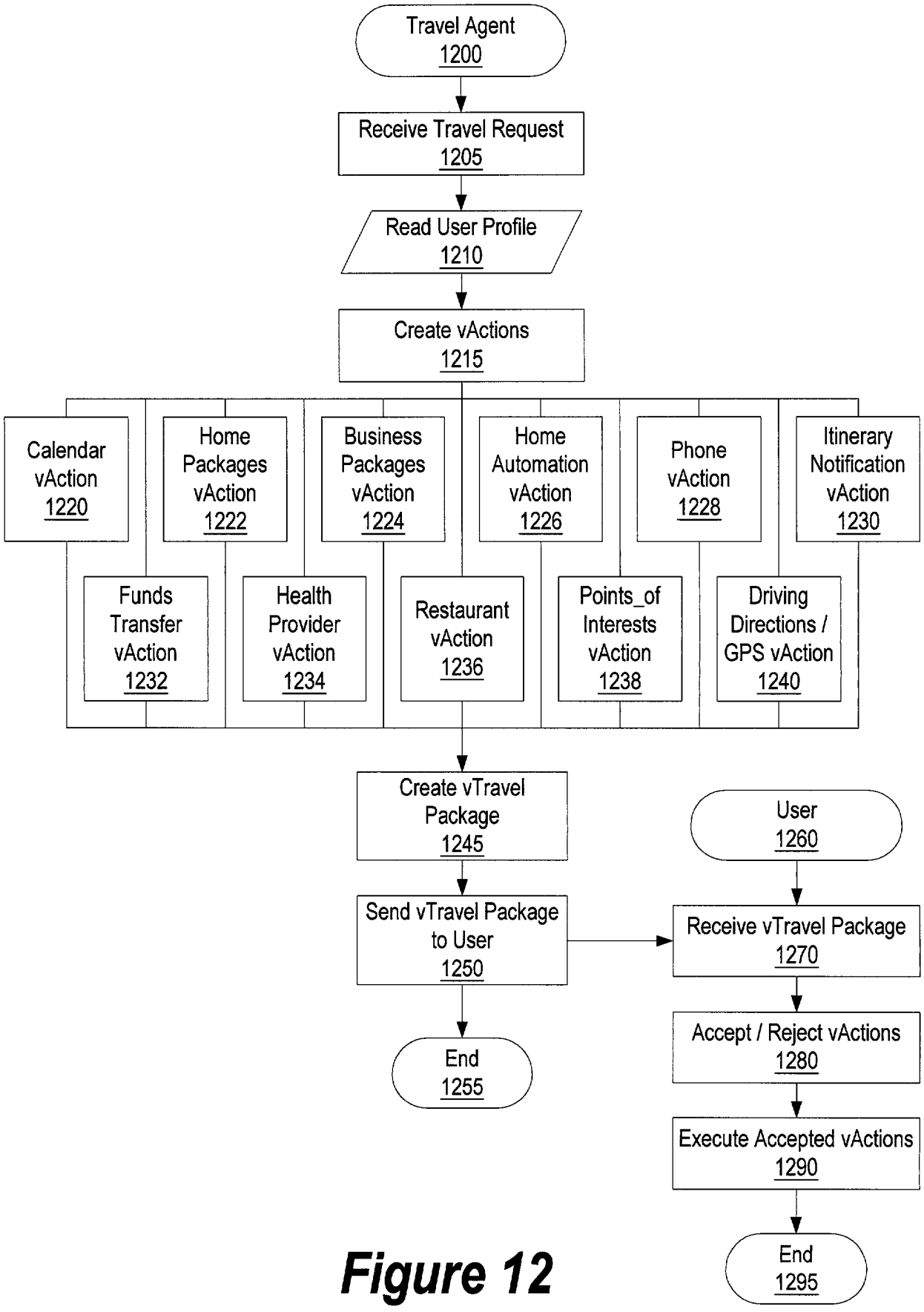

Travel Agent
1200
Receive Travel Request
1205
Read User Profile
1210
Create vActions
1215
Calendar vAction
1220
Home Packages vAction
1222
Business Packages vAction
1224
Home Automation vAction
1226
Phone vAction
1228
Itinerary Notification vAction
1230
Funds Transfer vAction
1232
Health Provider vAction
1234
Restaurant vAction
1236
Points_of Interests vAction
1238
Driving Directions / GPS vAction
1240
Create vTravel Package
1245
Send vTravel Package to User
1250
End
1255
User
1260
Receive vTravel Package
1270
Accept / Reject vActions
1280
Execute Accepted vActions
1290
End
1295

Figure 12

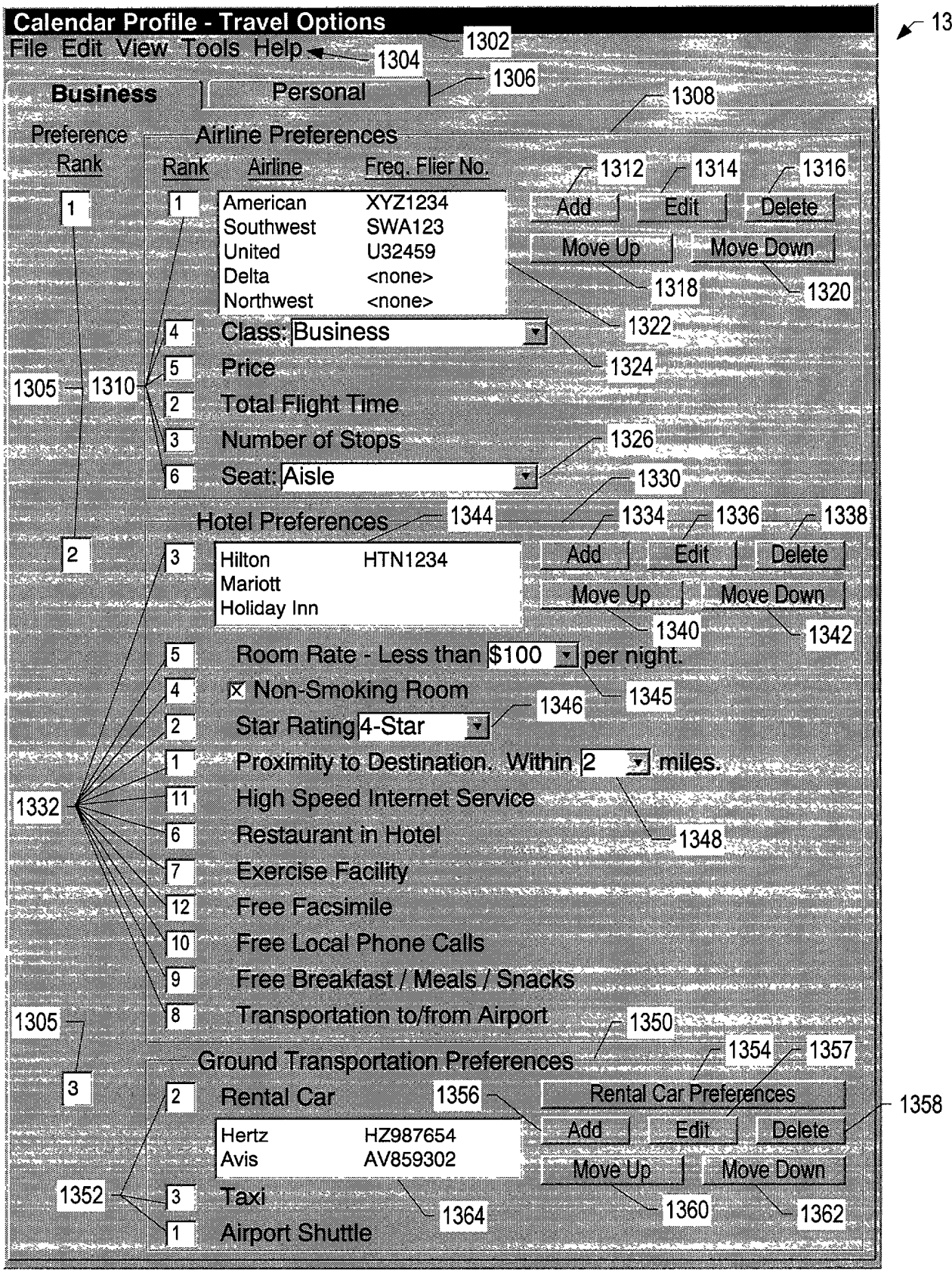

Calendar Profile - Travel Options
File Edit View Tools Help
Business
Personal
Preference Rank
Airline Preferences
Rank
Airline
Freq. Flier No.
American XYZ1234
Southwest SWA123
United U32459
Delta <none>
Northwest <none>
Add
Edit
Delete
Move Up
Move Down
Class: Business
Price
Total Flight Time
Number of Stops
Seat: Aisle
Hotel Preferences
Hilton HTN1234
Mariott
Holiday Inn
Room Rate - Less than $100 per night.
Non-Smoking Room
Star Rating 4-Star
Proximity to Destination. Within 2 miles.
High Speed Internet Service
Restaurant in Hotel
Exercise Facility
Free Facsimile
Free Local Phone Calls
Free Breakfast / Meals / Snacks
Transportation to/from Airport
Ground Transportation Preferences
Rental Car
Rental Car Preferences
Hertz HZ987654
Avis AV859302
Taxi
Airport Shuttle
1300
1302
1304
1306
1308
1310
1312
1314
1316
1318
1320
1322
1324
1326
1330
1332
1334
1336
1338
1340
1342
1344
1345
1346
1348
1350
1352
1354
1356
1357
1358
1360
1362
1364
1305

Figure 13

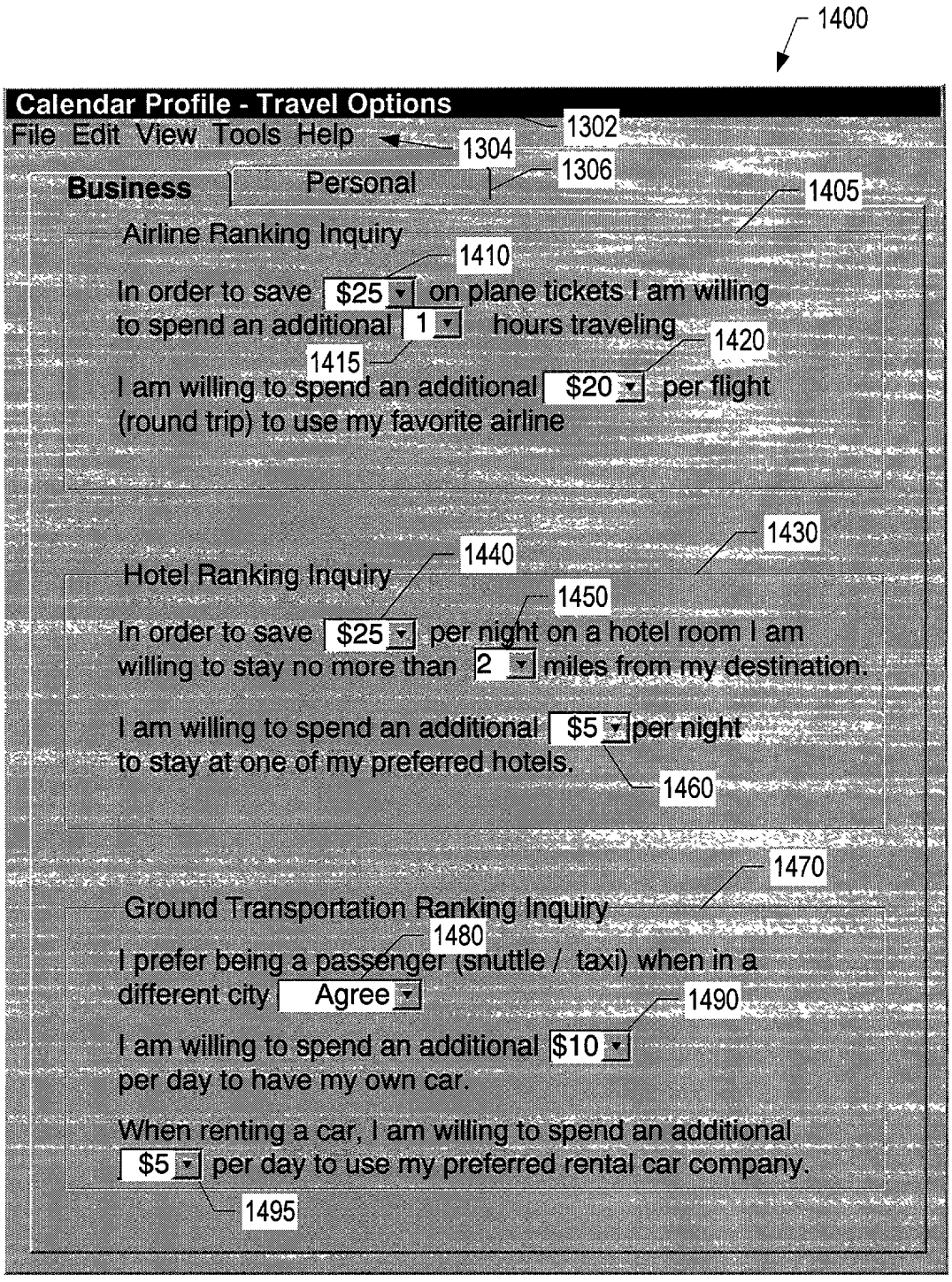

1400
Calendar Profile - Travel Options
File Edit View Tools Help
1302
1304
1306
Business
Personal
1405
Airline Ranking Inquiry
1410
In order to save $25 on plane tickets I am willing
to spend an additional 1 hours traveling
1415
1420
I am willing to spend an additional $20 per flight
(round trip) to use my favorite airline
1430
1440
Hotel Ranking Inquiry
1450
In order to save $25 per night on a hotel room I am
willing to stay no more than 2 miles from my destination.
I am willing to spend an additional $5 per night
to stay at one of my preferred hotels.
1460
1470
Ground Transportation Ranking Inquiry
1480
I prefer being a passenger (snuttle / taxi) when in a
different city Agree
1490
I am willing to spend an additional $10
per day to have my own car.
When renting a car, I am willing to spend an additional
$5 per day to use my preferred rental car company.
1495

Figure 14

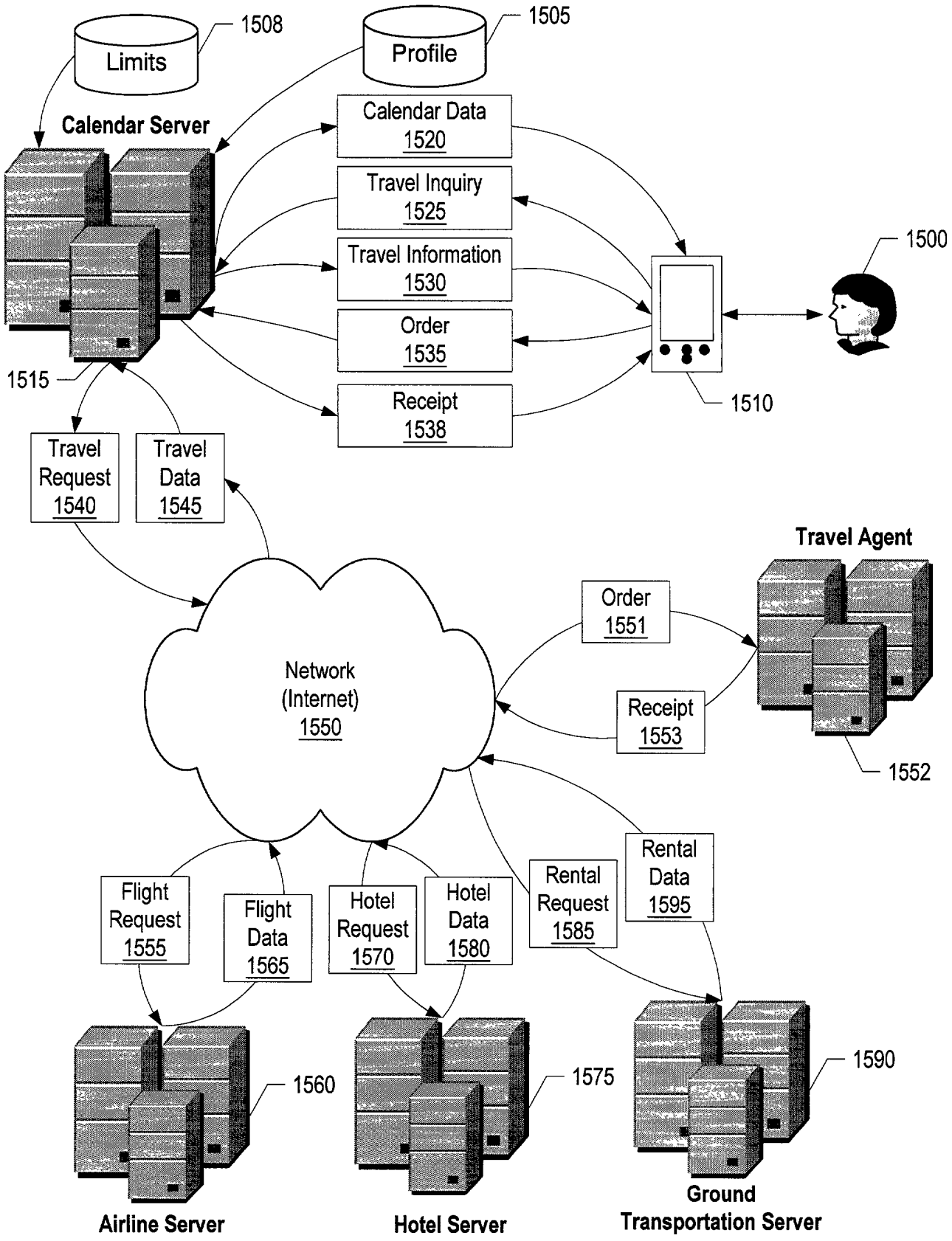

Limits
1508
Profile
1505
Calendar Server
Calendar Data
1520
Travel Inquiry
1525
Travel Information
1530
Order
1535
Receipt
1538
1500
1515
1510
Travel
Request
1540
Travel
Data
1545
Travel Agent
Order
1551
Network
(Internet)
1550
Receipt
1553
1552
Rental
Data
1595
Rental
Request
1585
Flight
Request
1555
Flight
Data
1565
Hotel
Request
1570
Hotel
Data
1580
1560
1575
1590
Airline Server
Hotel Server
Ground
Transportation Server

Figure 15

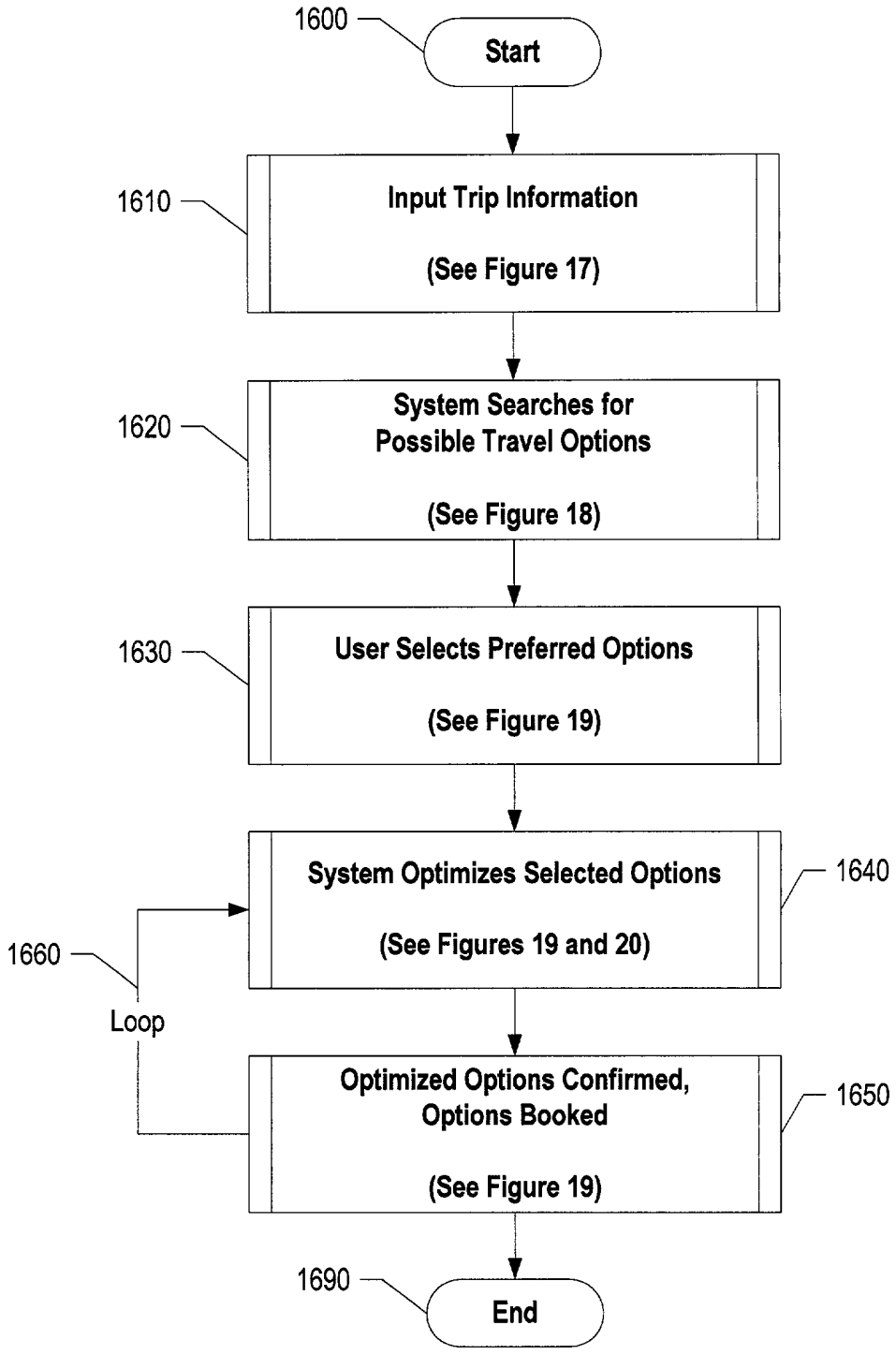

1600
Start
1610
Input Trip Information
(See Figure 17)
1620
System Searches for
Possible Travel Options
(See Figure 18)
1630
User Selects Preferred Options
(See Figure 19)
System Optimizes Selected Options
(See Figures 19 and 20)
1640
1660
Loop
Optimized Options Confirmed,
Options Booked
(See Figure 19)
1650
1690
End

Figure 16

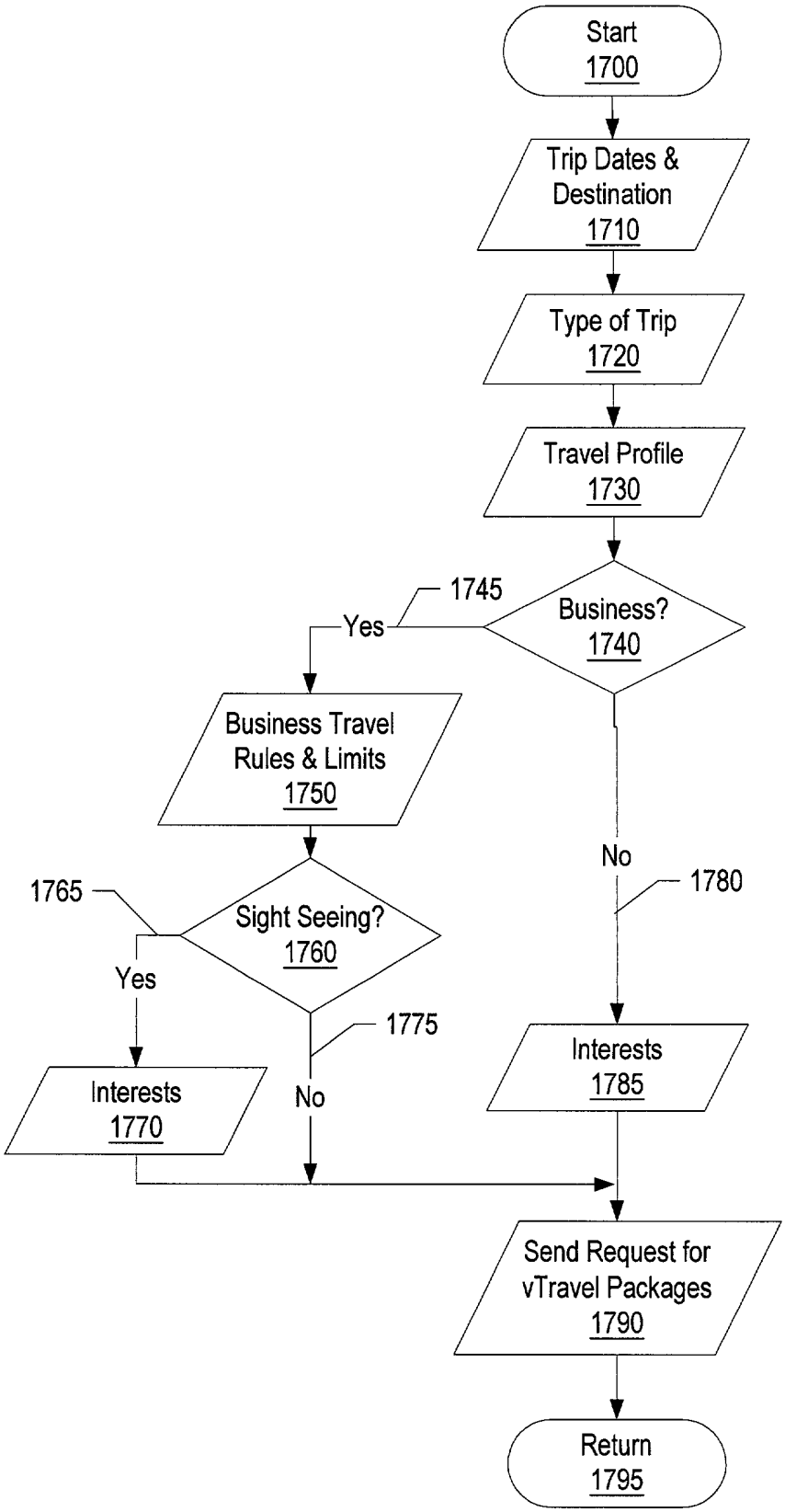

Start
1700
Trip Dates & Destination
1710
Type of Trip
1720
Travel Profile
1730
Business?
1740
1745
Yes
Business Travel Rules & Limits
1750
Sight Seeing?
1760
1765
Yes
Interests
1770
1775
No
No
1780
Interests
1785
Send Request for vTravel Packages
1790
Return
1795

Figure 17

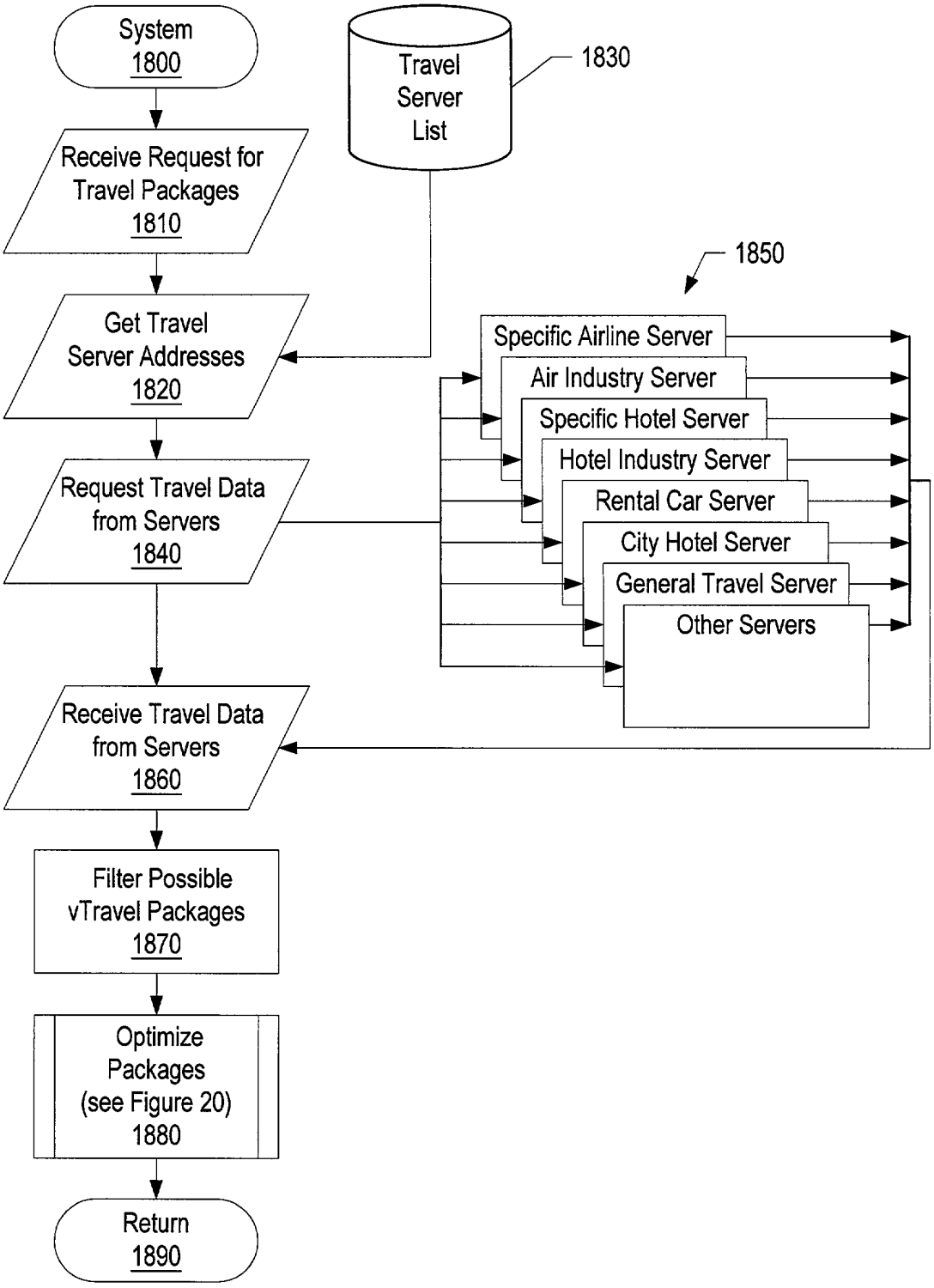

System
1800
Receive Request for
Travel Packages
1810
Get Travel
Server Addresses
1820
Request Travel Data
from Servers
1840
Receive Travel Data
from Servers
1860
Filter Possible
vTravel Packages
1870
Optimize
Packages
(see Figure 20)
1880
Return
1890
Travel
Server
List
1830
1850
Specific Airline Server
Air Industry Server
Specific Hotel Server
Hotel Industry Server
Rental Car Server
City Hotel Server
General Travel Server
Other Servers

Figure 18

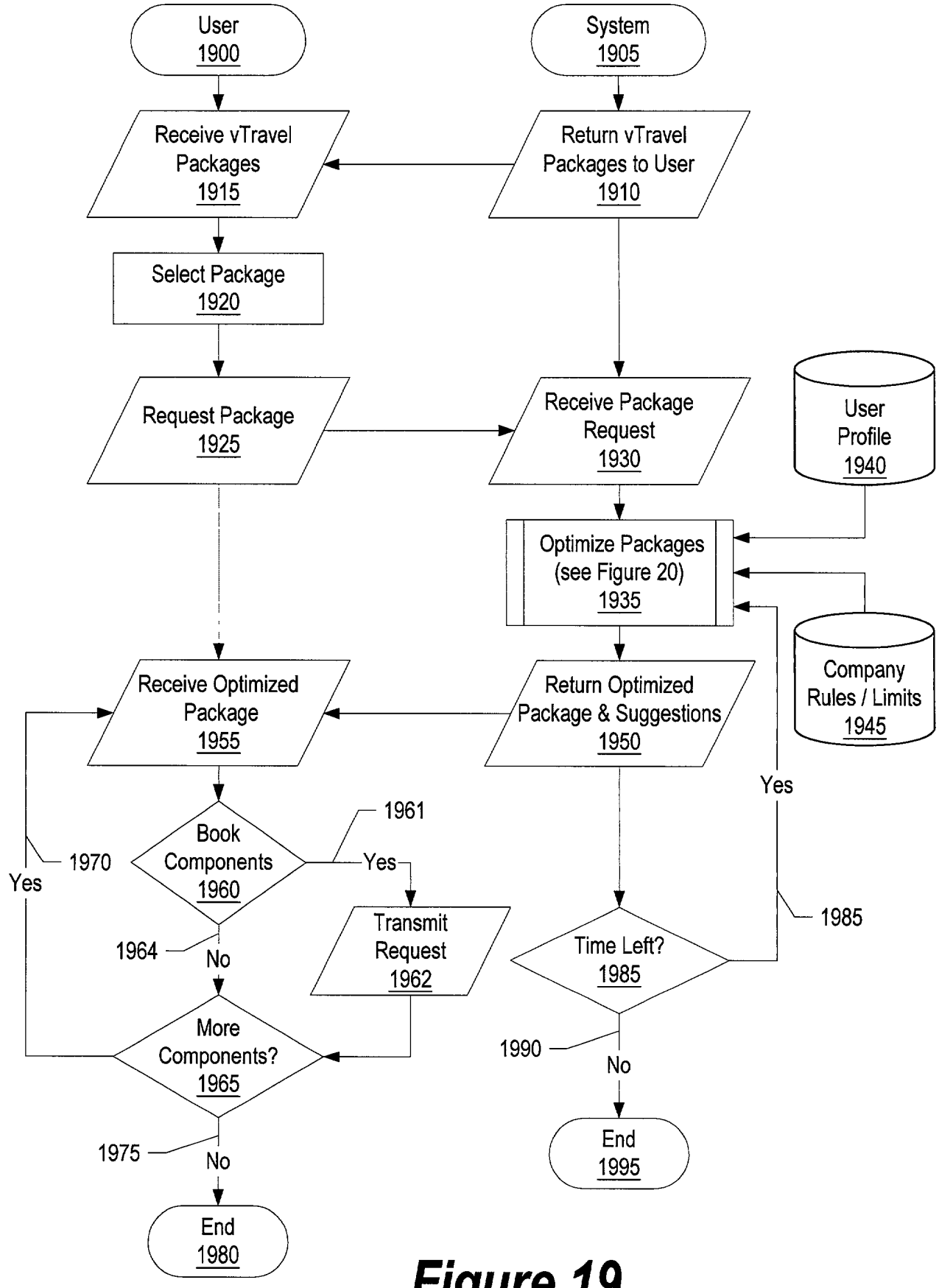

User
1900
System
1905
Receive vTravel Packages
1915
Return vTravel Packages to User
1910
Select Package
1920
Request Package
1925
Receive Package Request
1930
User Profile
1940
Optimize Packages (see Figure 20)
1935
Company Rules / Limits
1945
Receive Optimized Package
1955
Return Optimized Package & Suggestions
1950
Book Components
1960
1961
Yes
1970
Yes
Transmit Request
1962
1964
No
More Components?
1965
1975
No
End
1980
Yes
1985
Time Left?
1985
1990
No
End
1995

Figure 19

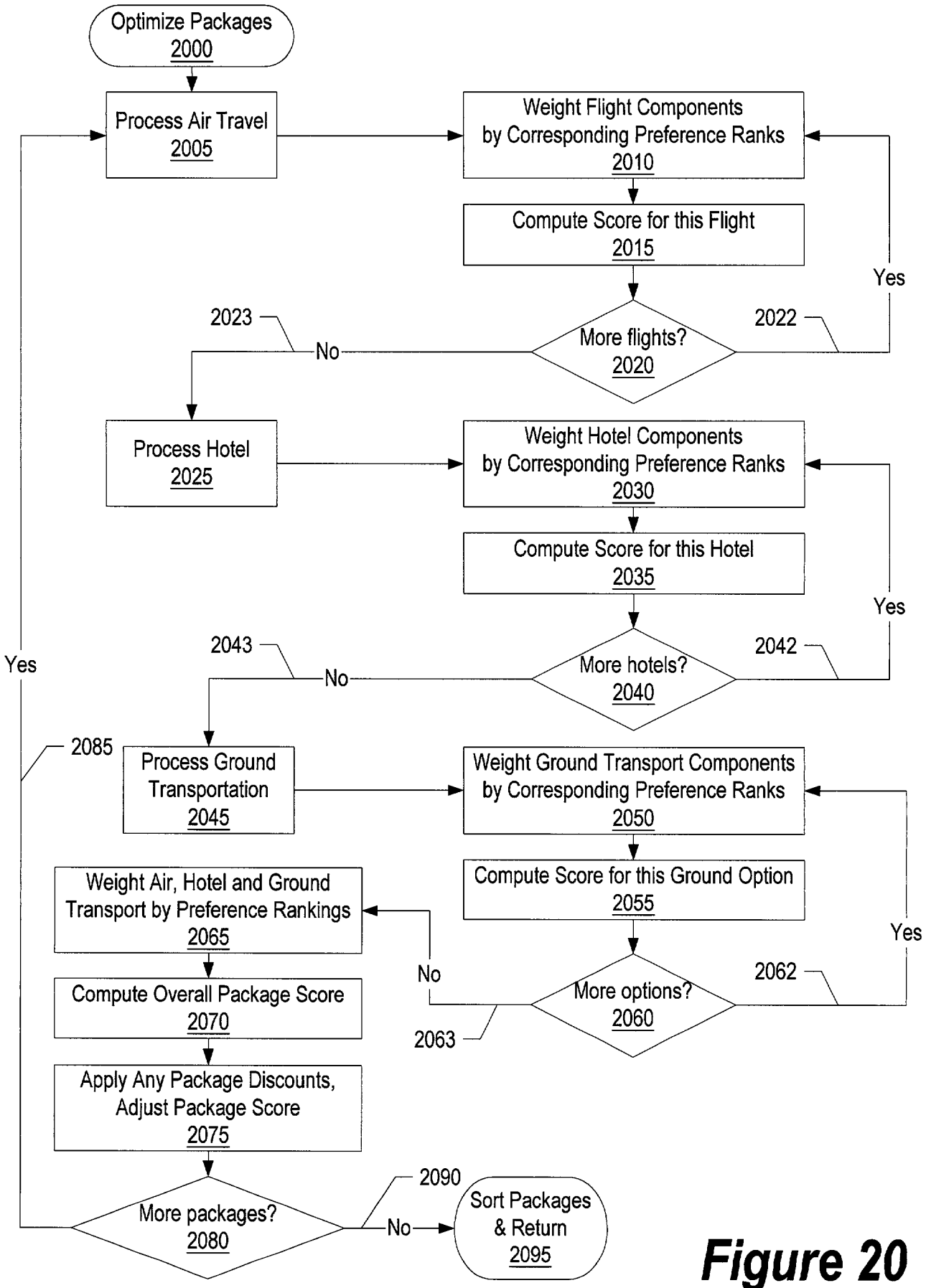

Optimize Packages
2000
Process Air Travel
2005
Weight Flight Components
by Corresponding Preference Ranks
2010
Compute Score for this Flight
2015
More flights?
2020
Yes
2022
No
2023
Process Hotel
2025
Weight Hotel Components
by Corresponding Preference Ranks
2030
Compute Score for this Hotel
2035
More hotels?
2040
Yes
2042
No
2043
Process Ground
Transportation
2045
Weight Ground Transport Components
by Corresponding Preference Ranks
2050
Compute Score for this Ground Option
2055
More options?
2060
Yes
2062
No
2063
Weight Air, Hotel and Ground
Transport by Preference Rankings
2065
Compute Overall Package Score
2070
Apply Any Package Discounts,
Adjust Package Score
2075
More packages?
2080
Yes
2085
No
2090
Sort Packages
& Return
2095

Figure 20

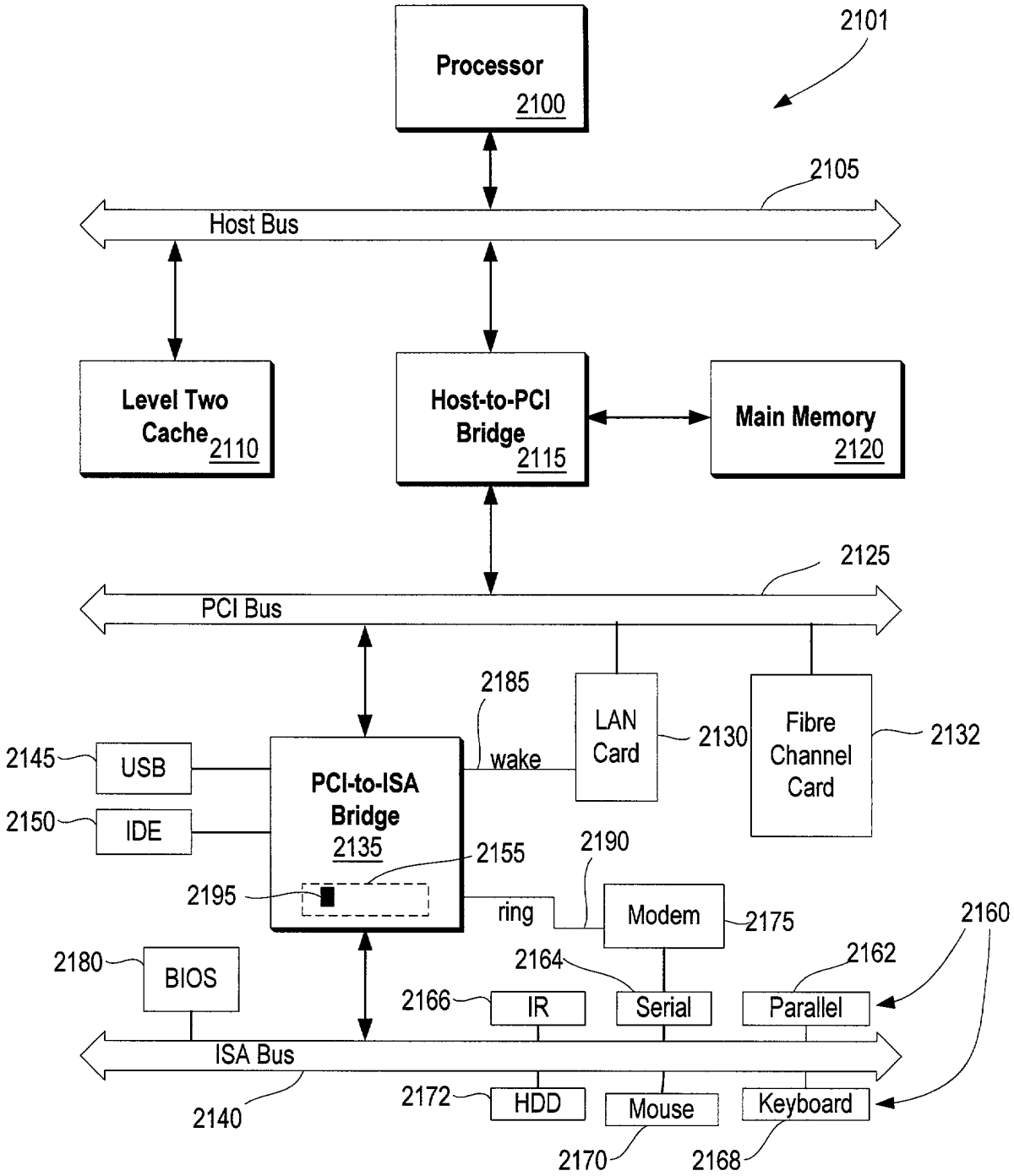

2101
Processor
2100
2105
Host Bus
Level Two
Cache
2110
Host-to-PCI
Bridge
2115
Main Memory
2120
2125
PCI Bus
2185
LAN
Card
2130
Fibre
Channel
Card
2132
2145
USB
wake
PCI-to-ISA
Bridge
2135
2150
IDE
2155
2190
2195
ring
Modem
2175
2160
2180
BIOS
2164
2162
2166
IR
Serial
Parallel
ISA Bus
2172
HDD
Mouse
Keyboard
2140
2170
2168

Figure 21

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

System and Method for Automating Travel Agent Operations

the specification of which (check one)

__X__ is attached hereto.

_____ was filed on _____
as Application Serial No. _____
and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):			Priority Claimed
_____ (Number)	_____ (Country)	_____ (Day/Month/Year)	____ Yes ____ No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial #)	(Filing Date)	(Status)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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